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ACCIDENTS IN ANÆSTHESIA.[1]

By CLIVE N. PATON,
Sydney.

THE object of this paper is to recount some of the accidents which may occur or have occurred in the practice of modern anæsthesia, more particularly those accidents which may be attributed to misadventure, to lack of vigilance or care, to human fallibility, or to the intrusion of that unpredictable factor which enters into every medical and surgical task.

No attempt will be made to deal with those accidents due to lack of clinical experience or to over-indulgence in the modern addiction to "polypharmacy", or with the alarming and unexpected results following employment of some of the newer and relatively untried relaxants.

There is no doubt that during the last twenty years the outstanding increase in our knowledge of the science and art of anæsthesia, with its accompanying diversity of methods, apparatus, preparations and drugs, has provided greatly increased scope for the occurrence of accidents. In fact, so many and diverse are the pitfalls that await the unwary that vigilance and care on the part of all concerned with anæsthesia are constantly demanded, as well as a thorough knowledge on the part of the anæsthetist of the behaviour of the apparatus and drugs being employed.

It has been my experience that most of these accidents occur early in the venture, usually in the induction period, for it is then that the patient is first exposed to the risk of the anæsthetist's potentially lethal armamentarium. Preparations for the administration of anæsthesia and its induction are perforce conducted in an atmosphere of bustle and activity, more or less noisy, and at the very time when the anæsthetist needs the maximum concentration of all his faculties.

However, he frequently finds that his is a truly solo performance, accompanied by the minimum of assistance and the maximum of distraction, whilst his attention is too often diverted by numerous minor details, some of which lie within the responsibility of the surgeon, or the hospital staff. Under such circumstances it is tragically easy to use a wrong solution, to inject it in the wrong place, or to use a faulty piece of apparatus such as a worn and frayed Magill tube or an unreliable spinal needle.

The simplest form of accident occurs with the use of the simpler forms of anæsthesia, and is usually easiest to anticipate and forestall.

In ether anæsthesia by the "open drop" method, the use of the wrong drug is not now so full of menace as in the days when chloroform had its place on every anæsthetic trolley. Many of us who have lived through this period have retained the habit of pouring a few drops of the anæsthetic agent on the back of the hand and identifying

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on December 11, 1952.

it by sniffing its appropriate odour. This habit also saves one the embarrassment of unavailing efforts to induce anæsthesia with such innocuous agents as distilled water or methylated spirits, both frequently stored in disused ether bottles.

The prevention of damage to the eyes, face, tongue, teeth and buccal cavity is, of course, fundamental in the administration of anæsthesia. Such damage does occur at times, despite every care, and appropriate treatment should always be adopted as soon as practicable. Simple conjunctivitis is the commonest sequel to eye trauma, and the routine instillation of *Oleum Ricini* is usually sufficient to prevent this. Corneal ulceration is most often the result of clumsy attempts to elicit eye reflexes, or of accidental trauma by the patient himself during a slow recovery period. It should be a matter for the ophthalmalogist's attention.

Teeth which may be broken or dislodged must be carefully sought after and removed. It is important, of course, that all fragments of broken teeth, fillings or crowns should be traced and removed. The thoracic surgeons of today are all too familiar with the grave sequelæ of the aspiration of such debris, frequently the result of a dental escapade of the well known "smash and grab" type, an archaic practice which is mentioned only to be condemned.

Artificial dentures, if complete, or nearly so, are nowadays frequently left *in situ* during anæsthesia, as being considerable support to the walls of the buccal cavity and to any artificial airway. Small dentures which may find their way into the hypopharynx are of course removed. A thorough inspection of the teeth before operation pays handsome dividends. One can then note the true nature of dentures, the nature of the bite and the presence of loose, carious or broken teeth, crowns and pivots.

Vomiting during "open ether" anæsthesia is most likely to occur in emergency surgery and obstetrics, and is always accompanied by grave risk of asphyxia from the aspiration of fluid vomitus or impaction of solid food matter in the trachea or large bronchi. It is important to remember that all peristalsis ceases at the moment of accident or an emotional upheaval, and should these happen soon after a meal is taken, the stomach may contain large quantities of partially digested food for many hours. In such an event, anæsthesia should be postponed for as long as possible, the urgency and nature of the proposed operation being borne in mind. Preliminary gastric lavage is never satisfactory, and cannot be relied upon as a means of total emptying of the stomach. If vomiting does occur, it can do so with surprisingly little effort or noise on the part of the patient. The outcome will depend largely on the quantity and nature of the vomitus, and if the immediate hazard is surmounted, upon whether it is grossly irritating or infective. In any event, vomiting during anæsthesia must be reckoned a threat of major disaster. Much depends upon the speed and dexterity with which the anæsthetist meets the emergency. The patient should be promptly placed in the Trendelenburg position, and a rapid and thorough suction toilet of the buccal cavity carried out. The larynx is visualized by direct laryngoscopy and intubated, a wide-bore endotracheal tube being used. Thorough tracheal suction toilet is now carried out, the patient being slowly rolled from one side to the other in an effort to empty any foreign matter from the bronchi into the trachea. Artificial inflation of the lungs with oxygen via the endotracheal tube completes the procedure, and in most cases restores the patient to a normal healthy colour. This procedure in my experience is far more expeditious and effective than the more difficult and laborious bronchoscopic drainage. This should be reserved for those few cases in which some signs of asphyxia persist despite vigorous application of the abovementioned steps. Speed and certainty of action are essential for success in such cases, and even a few seconds' delay or fumbling may mean the difference between air passages free of all foreign matter, and the onset of dangerous pulmonary œdema, which follows the entrance of even small quantities of fluid vomitus into the terminal bronchi and the alveolar bed.

Apart from obvious vomiting in anæsthesia, there occurs also the silent aspiration of quietly evacuated stomach contents. This is a more common serious accident in anæsthesia, is often fatal and is always preventible. It has been shown experimentally by staining the stomach contents with methylene blue via a Ryle's tube, that of 300 assorted patients undergoing abdominal surgical procedures, 26% regurgitated material, and of these 16% aspirated vomitus into the respiratory tract (Culver, Makel and Beecher, 1951). The lateral and Trendelenburg positions predispose patients to this accident, and, although the use of gastric drainage tubes minimizes the risk, it by no means eliminates it. The incidence of regurgitation is not influenced by the skill or experience of the anæsthetist; but there is a much higher incidence of aspiration of the regurgitated material among inexperienced anæsthetists. The presence of an endotracheal tube does not eliminate all risk of this accident. If a cuffed tube is used, the cuff must be so distended to render it water-tight in the trachea as to risk sloughing of the tracheal mucosa. Pharyngeal packs of paraffin gauze cause no damage to the pharyngeal mucosa, but are ineffective in damming back regurgitated fluid.

Expulsion of gastric contents by direct pressure on the stomach and duodenum is a very real hazard in all forms of abdominal surgery involving much manipulation, and the hazard increases in emergency surgery and in surgery of the upper part of the abdomen.

The paramount necessity is a thorough toilet of the pharynx, larynx and trachea, before extubation is carried out, at the close of the operation.

In cases of intestinal obstruction, when operation is performed under general anæsthesia, the vital need of early intubation of the larynx is too well known to need emphasis here.

Accidents due to Faults in Apparatus.

The modern closed-circuit anæsthetic unit is a complicated mechanical device, and the welfare and safety of the patient depend on the satisfactory behaviour of its many parts. It is of fundamental importance that the anæsthetist be thoroughly acquainted with the mechanical and physiological principles involved in the construction of the unit, and with its correct performance. Obviously, then, the young resident medical officer, with the scantiest knowledge and little experience, should not be entrusted with the operation of such a machine without supervision.

Some of the common acidents which may occur in the use of the modern anæsthetic unit are as follows:

1. Wrong coupling of gases may occur, so that nitrous oxide is placed on the oxygen yoke or *vice versa*. I have seen this mishap only once, but the rapid deterioration in the patient's condition in a surprisingly short time was most impressive. It was undoubtedly due to the removal of two empty tanks from the unit at the one time, and the accidental transposition by the operating theatre orderly of the replacement cylinders. Extreme care in removing empty and fitting full gas cylinders is called for at all times, and in public hospital practice this task should be restricted to a few responsible individuals, and the replacement tanks should always be checked by a second person.

A new device recommended by the International Standards Association promises to render such an error impossible, and it is confidently hoped that it will receive world-wide acceptance. This device consists in fitting all yokes with at least two pins to match holes drilled in the valve body of the corresponding gas cylinder. The locations of these pins are prescribed for the various gases. There are six holes, arranged in a curve below the valve outlet, and by using various combinations of two of them the whole range of gases can be covered. The international colour code for gas cylinders recommended by the same body, if adopted, will do much to save confusion between the various gases.

2. Leaving flowmeter and by-pass valves wide open can have disastrous results. There are still units in use not fitted with an oxygen pressure-reducing valve. The opening of a fully-charged oxygen cylinder under such circumstances has shattered the flowmeter housing and bombarded those nearest with showers of glass fragments; or in the case of an open by-pass, the bag or even the patient's lung may be suddenly and violently distended.

3. Pressure-reducing valves of the American type should always be released after use. Keeping them constantly screwed down submits the diaphragm to needless strain and fatigue and introduces the risk of sudden failure with admission of gases at high pressure into the unit.

4. Exhausted soda lime is prone to be used inadvertently in units used by numbers of anæsthetists. If there is clinical evidence of a rapid accumulation of carbon dioxide, other circumstances being normal, the soda lime should be renewed, irrespective of its purported condition. Rapid accumulation of carbon dioxide leads to surprisingly quick deterioration in any patient's condition, and under certain circumstances can lead to prostration, collapse, convulsions and death.

5. I have on several occasions drained two or three ounces of water from corrugated hoses, carelessly left in them by the attendant responsible for washing them. Its presence is indicated by coarse gurgling noises from the

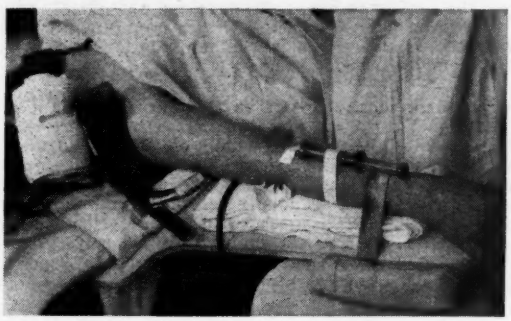

FIGURE I.

Abducted arm, correct position. Angle approximately 75°. Arm pronated. Arm board supported and body weight carried on the acromio-clavicular joint area.

unit synchronous with respiration. The danger lies in the adoption of a steep Trendelenburg position in such an event, which would result in the patient's mouth and nose being inundated.

6. Empty nitrous oxide cylinders should be turned off at once. If they are left open and the ether unit also is open, it has been said that the negative pressure in the empty cylinder may aspirate some ether vapour, which may form an explosive mixture with the small amount of oil used in compressing the gas. This advice should not be necessary, as a conscientious anæsthetist will leave a unit as he found it—that is, equipped with a full supply of all expendables, including gases, and with every valve and gate turned off.

7. Face-pieces must be free of all projections and sharp edges, and all chemicals or potential irritants used in sterilization removed by washing. I have twice seen a patient's face damaged by such lack of care. The head harness should be in good condition and not of perished rubber, held together with string, sticking-plaster or safety-pins. The parotid gland and duct have been injured by the use of such makeshifts.

The ether insufflator, a most popular anæsthetic device in Australia, probably stands alone as the greatest single cause of anæsthetic accident. It has been responsible for most of the anæsthetic fires and explosions and for a number of cases of surgical emphysema, and has delivered large quantities of ether to the human subject, grossly deteriorated through overheating and containing varying amounts of peroxides, aldehydes and alcohol as a consequence.

The commonly used form consists of a one-eighth horse-power electric motor driving a small centrifugal fan. The draught thus created is passed over ether, contained in a copper tank fitted with an electric warming device. A manometer and adjustable safety-valve are provided, and an ether trap to collect any liquid ether which may be blown over from an overfilled tank. The motor is lubricated automatically from an adjacent oil container. The whole is neatly contained in a leather case. Every one of these components is capable of generating serious accident, including the leather case, for, with the lid of the case closed, a small leak of ether vapour can convert its interior into a closed container, highly charged with inflammable and explosive vapour. An occasional spark from the armature or the introduction of oxygen can then originate a shattering and dangerous explosion. Such explosions have occurred with disastrous consequences to the patient, the operating theatre team and the apparatus.

For the safe working of the potentially lethal ether insufflator, the following precautions are suggested.

1. The motor and fan should be contained in a separate unit, accommodated preferably outside the operating theatre, or at least on a stand not less than three feet from the floor. This removes the danger of fire and explosion due to accidental sparking. Ether vapour, being heavier than air, forms a layer close to ground level.

2. The mercury manometer should be checked and the safety-valve proved to "blow-off" at a pressure of not more than 20 millimetres. This will protect the patient's respiratory tract from exposure to dangerously high pressures.

3. The ether trap should really function as a trap. The ether used should be fresh, and only small quantities should be placed in the tank at one time. All unused ether should be drained off and discarded.

4. The lubricating mechanism of the motor should be inspected at least once every six months.

5. The warming device should be limited in capacity and used sparingly.

6. Any oxygen delivered to the unit must be at low pressure.

7. The contents of the delivery tube should be sampled before delivery to the patient.

Accidents Peculiar to Special Types of Anæsthesia.

Endotracheal Anæsthesia.

Endotracheal anæsthesia has become so much part and parcel of our everyday routine in anæsthesia as to be regarded as a minor technical variation of the art. However, intubation of the larynx with any of the modern types of endotracheal tube is always a major procedure. Its potentialities for damage and accident are great, and scrupulous attention to detail is always imperative. The tubes available should always be inspected and a suitable one selected for the particular task. It should be carefully inspected for size, shape, flaws in quality, strength and flexibility.

Some of the mishaps that may attend the employment of endotracheal anæsthesia are as follows.

1. Intubation of the œsophagus is uncommon among experienced anæsthetists, but a real hazard among novices. The absence of the "tell-tale" expiratory puff or cough on intubation, the characteristic sucking noises emanating from the œsophagus, and rapid lightening of anæsthesia, should make the tiro alert and avoid the danger of over-distending the stomach or of introducing inflammable gas mixtures into the alimentary tract. If an insufflator is in use, prompt action is needed to avoid rupture of the stomach.

2. A faulty endotracheal tube may be used. (*a*) This tube may be too harsh and rigid, leading to excessive trauma, accidental hæmorrhage in any part of its passage or failure to adapt itself to the desired position. (*b*) The tube may be too old and worn, usually the victim of much use and boiling. Such tubes are very prone to kinking and distortion. Worn and perished parts such as the tip may become detached and become a loose foreign body in the respiratory tract. (*c*) The tube may be too short, so that insufficient of it projects into the glottic opening. Continuity of airway is lost easily during manipulations of the apparatus or the surgical site, and the consequences may be disturbing in the presence of thorough packing off of the pharynx. (*d*) The tube may be too long. In this event, the tube usually enters the right main bronchus. The air imprisoned in the left lung soon becomes vitiated, there is a rapid build-up of hypoxia, and deterioration and death rapidly follow if the condition is not remedied. I have

seen this accident occur on several occasions, once with a fatal termination. The alert anæsthetist will discern the trouble at once, as indicated by the patient's increased respiratory activity, deteriorating colour and diminished movement on the left side.

3. Obstruction due to kinking, angulation or compression, when complete, is obvious and at once rectified. The lesser degrees are indicated only by increased respiratory effort, sweating and the usual concomitants of oxygen lack and carbon dioxide accumulation. They call for vigilance and intelligent interpretation if serious sequelæ are to be avoided.

4. The leaving of the endotracheal tube in the trachea is easier than seems likely at first sight. This mishap usually occurs with the smaller sized tubes, which fit but loosely

FIGURE II.

Abducted arm, incorrect position. Angle more than 90°. Arm hyperabducted and supinated. Body weight carried on the root of the neck.

into the glottic opening. It usually occurs because the anæsthetist concludes that somebody else has removed the tube at the conclusion of the operation, whilst his attention has been diverted elsewhere. Actually it has been disconnected and has slipped down out of sight, and the unconscious patient is returned to bed with tube *in situ*. I have seen a rubber tube removed three days after an accident of this kind, following tonsillectomy. The patient developed a crop of multiple laryngeal polypi after a very stormy convalescence, and these were removed in two sessions under general anæsthesia. It must be emphasized that the anæsthetist, who places the tube in position, is alone responsible for its removal. No person other than his authorized assistant or himself should be expected, or indeed permitted, to interfere with an endotracheal tube. The tube should always, except when held *in situ* securely by the anæsthetist's hands, be guarded and identified by a connexion, a T-piece, a Cobb's elbow or even a safety-pin.

5. Trauma to nose and pharyngeal wall, although embarrassing, is seldom serious. Brisk hæmorrhage may occur from the nose during the passage of a naso-tracheal tube, and adhesions in the region of the septum are a possible sequel.

6. Trauma to the larynx and trachea is in a different category, and may vary from temporary hoarseness due to mild infective laryngitis to actual avulsion of a vocal cord. In between these extremes, injuries which may follow intubation include the following: (*a*) hæmorrhage from the vocal cords and hæmatoma formation; (*b*) irritation from the use of antiseptic lotions such as "Zephiran"; (*c*) abrasion or laceration of the tracheal mucosa; (*d*) laceration and œdema of the vocal cords, which usually appear two or three hours after anæsthesia; (*e*) perforation of the trachea, which is very rare; (*f*) granuloma of the vocal cords, appearing from four to five months after anæsthesia. Flagg (1951) considers that the following are predisposing causes of the various injuries: (i) the use of oversized tubes; (ii) the use of the endotracheal inflatable cuff rather than pharyngeal gauze packing; (iii) intubation by the "blind" technique.

There is little doubt that in efforts to secure as adequate an airway as possible, one is inclined to use oversize endotracheal tubes, and that in guarding against damage to the larynx, more attention should be paid to the outside rather than the inside diameter of the tube. Laryngeal damage has become more common since the advent of the Magill type of tube, and was relatively unknown in the days of insufflation through the narrow gum-elastic catheter.

Whether the use of the endotracheal inflatable cuff increases the risk of damage is debatable. I have not experienced any sequelæ traceable to its use on many hundreds of occasions, and find it difficult to believe that it is a major cause of damage.

Blind intubation, a fast-disappearing art, is now rarely performed. There appears to be no reason why the manœuvre *per se* should increase the risk of trauma, if carried out smoothly, with adequate relaxation and a minimum of manipulation. In the days when it was commonly done, the assistance of the laryngoscope was quickly sought if intubation was not possible with rapid facility. The alternative—namely, prolonged manipulation of the neck, larynx and tube—could obviously carry a greater risk of trauma.

Granuloma of the larynx is the most important long-range sequel to laryngeal intubation. It is of the nature of an organized hæmatoma, usually on the free edge of the true cord and occurring almost exclusively in the posterior portion of the cords, the commonest situation being the vocal process. It is commonly held now, that the basis of the injury is backward pressure on the posterior portion of the cords and on the arytenoids by a sharply recurving tube, and that this pressure is aggravated by operating postures demanding extention of the neck, as in thyroidectomy and tonsillectomy; two other causes of the injury are tracheal manipulation by the surgeon, and the use of pharyngeal gauze packs increasing the backwards pressure of the tube (Moulden and Wynne, 1951).

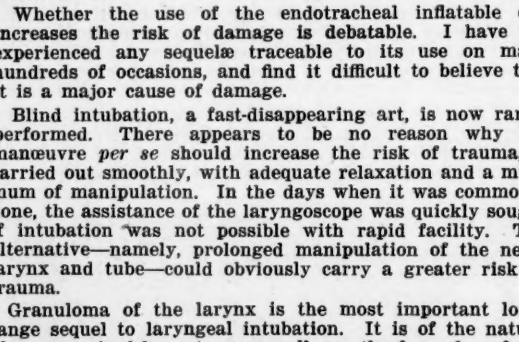

FIGURE III.

Arm arranged across the patient's chest for intravenous medication.

This type of accidental damage occurs more frequently with the use of red rubber than with "Portex" tubes, which are said to accommodate themselves more readily to any required curve at body temperature. It more commonly follows transnasal than transoral intubation, the degree of recurvation of the tube being considerably enhanced. This fact in some measure accounts for the impression that "blind" intubation of itself accounted for a great deal of laryngeal damage.

Necessary precautions for the avoidance of laryngeal and tracheal damage are the following: (i) Careful scrutiny of each tube before use as to its state of hardness and the smoothness of its bevel. (ii) Avoidance of pushing against closed vocal cords, of intubation or extubation in light anæsthesia, and of over-manipulation with the head and

neck in faulty position. (iii) Avoidance of intubation when the larynx has been the seat of preexisting disease.

Surgical emphysema during anæsthesia may, of course, be of surgical origin; but if it does occur it behoves the anæsthetist to take stock of the situation, to ascertain whether the anæsthesia is responsible for or has contributed to the occurrence. High intrapulmonary pressures, together with abrasion of the mucosa of the respiratory tract, are the basic causes, and such pressures are most commonly due to faulty insufflation anæsthesia, to too liberal a use of emergency gas valves, or to gross overdistension of the rebreathing bag.

Impaction of a mucus plug in a large bronchus is a less commonly known cause. It is well known that the larger bronchi become dilated during inspiration and return to normal during expiration. Sufficient space may thus be created for gases to pass the obstructing plug on inspiration, but they are obstructed on expiration by the now snugly-fitting mucus plug. The result is a progressive rise in intrapulmonary pressure in the segment of lung beyond the obstruction, with risk of alveolar rupure and surgical emphysema. Intermittent obstruction in the anæsthetic apparatus, such as the sticking of a check valve, may have a similar effect.

Spinal Analgesia.

Spinal analgesia has of recent years fallen into disuse, partly because of the widespread adoption of the modern relaxants combined with light general anæsthesia, and partly because of the risk of serious accident. It is unfortunate that so useful a form of anæsthesia should have fallen so far from grace. It still has a definite and useful place in modern anæsthesia.

Infection, one of the major hazards, now calls for the performance of the spinal tap under full surgical aseptic technique. The anæsthetist, after thorough scrubbing, must be gloved, gowned and masked, and all needles, preparations and syringes sterilized by autoclaving.

Permanent motor palsy and loss of sensory function are usually due to direct transfixation of the cord, *conus medullaris* and component parts of the *cauda equina*, and their injection with anæsthetic substances. Such a disaster is avoided by using only fine spinal needles with short bevels, and by never making a spinal puncture anywhere except at the safe lower lumbar intervertebral spaces.

Macintosh draws attention to the grave risk of immersing ampoules of the spinal analgesic drug in spirit or spirituous solutions. Spirit may enter such ampoules through minute flaws in the glass, and may then be injected into the spinal theca quite unwittingly. Permanent loss of function from damage to the cord could result from this mishap (Macintosh, 1951).

Cranial nerve palsies are rare and mostly transient. I have seen one abducent nerve palsy in many thousands of spinal anæsthetic cases. It occurred in a young man who had had a hernia repaired under this form of anæsthesia. His condition was good throughout, and he had no headache or other untoward symptoms after operation. He developed diplopia on the third day, which lasted for eight weeks.

A broken spinal needle is very uncommon nowadays, when the modern high-grade stainless malleable spinal needle is used. It is frequently due to sudden and unexpected movement by the patient, and is more apt to occur with an old, worn and much bent needle. Much of the broken portion usually lies embedded in the interspinous ligaments, and its removal is a major surgical venture, usually carried out by the well-known Lahey technique (Maxon, 1938).

Wrong solutions may be used. Absolute alcohol, "Vinesthene" and andrenaline have been injected into the spinal theca, usually with disastrous results, in mistake for the proper analgesic drug (Macintosh, 1949). Careful checking by the anæsthetist and double checking by a reliable assistant are therefore essential. Loaded syringes should not be left lying about unidentified. The empty ampoule should be inverted over the nozzle of the syringe or its attached needle. The numerous ampoules of potentially dangerous drugs used by the modern anæsthetist leave much to be desired in the way of packing, colouring and inscribing. There is too much similarity in general appearance between drugs of widely different use and behaviour, the inscribed label, with few exceptions, is small and indistinct, and there is no standardization of packing among the various firms of manufacturing chemists. Thus "Nupercaine" (one in 200), "Flaxedil" and "Eulissin" are very similar in appearance, and I have seen an ampoule of "Nupercaine" included in the supply of "Flaxedil" placed upon the anæsthetist's sterile table. Morphine, atropine and pethidine are marketed in tiny one-millilitre ampoules of identical appearance and indistinct marking, and adrenaline, the greatest death dealer of all, may appear in any form the manufacturer chooses. It is more than high time that some uniformity in packing and marking of the various preparations was laid down by public health regulation.

Injury or fall whilst the patient is being postured is an ever present hazard. Many of the patients for spinal anæsthesia are old or ill or both, all are dulled further by premedication, and few are cooperative. When possible, a brief and clear explanation of what is about to be done is worth more than a vast amount of brute force and struggle to put the patient into position. Nevertheless, one should always have the aid of an experienced and intelligent attendant or nursing sister in posturing the patient. I have seen a patient who had just received a spinal injection slide smartly off the table on to the floor, the table having been tilted steeply, in the absence of shoulder rests. Another, after having received a spinal injection in the lateral position, resumed the supine position with such alacrity at the word of command as to fall off via the opposite side. He received another form of anæsthesia for the suture of a scalp wound and his original operation was postponed.

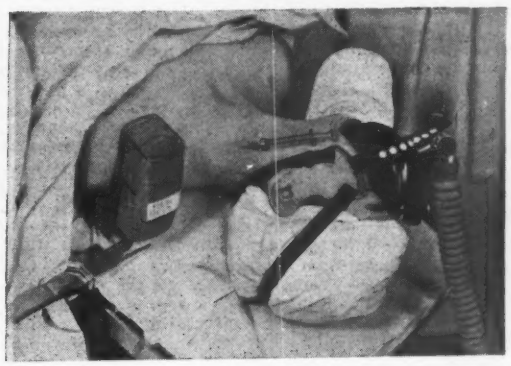

FIGURE IV.

Intravenous medication via the external jugular vein. Shoulder rest in correct position.

Lumbar puncture death, a rare accident in the induction of spinal analgesia, is said to be due to the escape of a large quantity of cerebro-spinal fluid with herniation of the brain stem through the *foramen magnum*. Sudden death follows from pressure on the vital centres in the medulla. In most recorded cases the patient is found to have an undetected cerebral lesion. Puncture in the lateral position and the use of a fine spinal needle are some safeguard against it.

Intravenous Anæsthesia.

It seems unfortunate that the manufacturers of the modern intravenous anæsthetic agents should have selected stronger solutions for general use than are generally safe. The 5% solutions of "Pentothal Sodium", "Intraval" *et cetera* are strongly alkaline, hæmolytic and powerfully vasopastic, and therein lies most of their danger. The 2·5% solution is much less noxious in these directions, and now that we have learned to use minimal doses, the former objection to the handling of bulky solutions does not apply.

Extravascular injection of 5% thiopentone solution in small quantities causes local irritation and blanching, followed by redness and œdema. Small quantities (up to two or three millilitres) should be diluted with an equal quantity of sterile distilled water. This is injected subcutaneously in a fan-shaped manner into the extravasated area, and gentle massage is applied to promote dilution. With larger quantities it is better to use, in similar fashion, a 1% solution of procaine (without adrenaline), which, besides dilution, has a local vasodilatory action. Fomentations, radiant heat and bandaging should not be employed, as being likely to promote sloughing. Small quantities of the 2·5% solution injected extravascularly do no harm.

Intraarterial injection is a serious accident and calls for close watching and prompt attention. The general effect is one of intense vasospasm distal to the site of injection, and there is grave risk of gangrene in the fingers and hand, the vasospastic effect being prolonged and intense. The severity of these effects varies directly with the amount of solution injected and its strength. Accidental intraarterial injection is usually made into the brachial artery as it crosses the antecubital fossa. Its wall is inadvertently punctured whilst an attempt is being made at venepuncture of the median basilic vein, which lies immediately anterior to the artery. It commonly occurs in obese subjects, whose veins are not readily accessible and are difficult to puncture, or in emaciated elderly people with scanty subcutaneous tissue, in whom the artery and vein lie in close apposition. Its occurrence is indicated by the following: (i) the entry of a forcible jet of bright arterial blood into the syringe, often with sufficient force to drive the plunger of the syringe backwards; (ii) absence of the usual anæsthetic effect of the injection; (iii) onset of intense pain in the hands and fingers; (iv) rapid blanching of the finger tips and borders.

If only a small quantity (two or three millilitres of a 5% solution) is injected, prompt injection of 10 millilitres of 1% procaine solution intravenously under light tourniquet compression may quickly overcome the vasospasm. If any larger quantity is injected or severe symptoms persist, the only way of protecting the circulation in the hands and fingers is by immediate induction of brachial plexus block analgesia.

Paresis of a neighbouring nerve trunk, such as the median nerve in the antecubital fossa as it lies behind the median basilic vein, is due similarly to the pooling of thiopentone extravascularly, in contact with the nerve trunk. The damage may be done by actual injection of the solution into the nerve trunk. Such cases must be due to rather heroic and desperate attempts to find a vein. The damage, unfortunately, is not obvious until the patient has completely recovered from the anæsthesia. Improvement is slow and uncertain.

Thrombophlebitis may follow intravenous anæsthesia, and invariably occurs when the needle used fits tightly into the selected vein. This suggests that the condition originates in mechanical damage to the endothelium, together with the irritation of the solution used. It is usually of small dimensions and short duration and rarely calls for treatment.

Careful selection of patients for intravenous anæsthesia, and the use of minimal dosage to secure the desired effect, will avoid many of the hazards of intravenous anæsthesia. The use of the weaker solution (2·5%) is an additional safeguard, and in general its use should be restricted to: (i) anæsthesia for short minor procedures; (ii) as a basal narcotic; (iii) as a pleasant method of inducing unconsciousness.

To embark upon intravenous anæsthesia for a patient who has no readily accessible veins is to court trouble. Neither should this form of anæsthesia be used for the very old or very young, or for those suffering from severe shock or the results of recent severe hæmorrhage.

Local Anæsthesia.

Injection of the wrong solution is the paramount hazard in relation to local anæsthesia, and former remarks regarding double checking of solutions, clear labelling of ampoules, and care with loaded syringes apply with equal force. Weak solutions only should invariably be used, especially when one is dealing with the newer local analgesic drugs—"Nupercaine" and amethocaine. Intravenous injection of local anæsthetic solutions has always been regarded as a danger. It is, however, easy to guard against, and we know that quite large quantities of procaine may be injected intravenously without untoward effect. In the performance of paravertebral block, intrathecal puncture and injection form a very real hazard. The effects may be disastrous, and constant proof by aspiration that the needle is not in the spinal theca is indicated in carrying out this form of regional block analgesia.

Sloughing is an accidental sequel to local infiltration anæsthesia which must always be kept in mind. It usually follows excessive infiltration, especially in old debilitated subjects. It is commonest in the extremities, and the inclusion of adrenaline in the anæsthetic solution increases the risk of its occurrence. I myself feel that the inclusion of adrenaline in local anæsthetic solutions is of such doubtful value, and on the other hand so appreciably

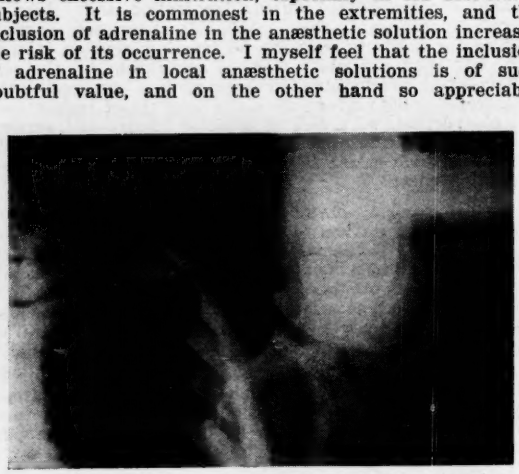

FIGURE V.
Radiograph of shoulder joint with shoulder rest in correct position.

increases the toxicity and danger of such solutions, that it would be better practice to omit it altogether. Mackintosh has drawn attention to the special menace of cocaine with adrenaline and emphasizes the fact that the toxicity of both drugs is increased when they are in combination (Mackintosh, 1949).

Accidents due to Posture.

Modern surgery demands that patients be placed in many grotesque and unphysiological positions, and constant care and vigilance are necessary for the prevention of accident. The anæsthetist by common consent assumes a leading part in posturing the patient, and it is his duty to see that the surgical requirements do not make excessive or hazardous demands on the anatomy or physiology of the patient. Most accidents occur through undue pressure upon exposed vessels or nerves or through dangerous obstruction to respiration.

In the supine position, the natural and most commonly used, the arms should be held at the patient's sides by a towel passed under him. The medial epicondyle of the humerus with the adjacent ulnar nerve should be protected from pressure, and the hands should rest lightly at the sides. Gangrene of the finger tips has been noted in elderly subjects after long operations, with the outstretched fingers placed under the buttocks. Of course the arms are never raised above the head, because of the risk of development of a palsy of the Klumpke type. In long operations, the feet should be supported on a soft pillow to prevent pressure on the calves and consequent thrombosis. The feet should not be allowed to project beyond the end of the table. This entails risk of accidental injury or of burning from adjacent steam heaters. Excessive use of the gall-bladder rest is a disadvantage to the patient. It reduces vital capacity by 12·5% and is a common cause of post-operative backache (Hasler, 1948).

The Trendelenburg position at a tilt of 22° impairs respiratory movement by 17%. It impairs return of blood to the heart by causing collapse of 20% of active lung, and so reducing the degree of negative intrapleural pressure. At an angle of 40° these effects are much increased, and unless the anæsthetist adopts adequate compensatory steps, the patient's safety may be seriously jeopardized by sustained deficient pulmonary ventilation. It is important also in this position to have the angle of the table opposite the patient's knees, as a protection against damage to the popliteal artery or nerve.

In the lithotomy position the common peroneal nerve is exposed to damage from pressure from some types of leg support. The hip joints in elderly subjects are frequently capable of only limited movement, even under anæsthesia, and undue force must not be used in arranging the legs in this position.

Brachial plexus palsy after surgery under general anæsthesia has occurred from time to time for many years, but its incidence appears to have increased in recent years,

FIGURE VI.

Radiograph of shoulder joint with shoulder rest in incorrect position, and with arm in increased abduction, showing increased prominence of the head of the humerus.

with the use of the abducted arm for intravenous therapy, and with the use of relaxants. It occurs most commonly when such conditions are applied with the patient in the Trendelenburg position, although the accident has followed cholecystectomy (Kiloh, 1950). Formerly it was considered that the paresis resulted from compression of parts of the brachial plexus between the clavicle and the first rib. Cadaveric studies show that such compression does not take place, and if it did, it is doubtful whether or not such compression would be capable of producing the widespread loss of motor and sensory function sometimes seen in such cases. The condition most commonly follows prolonged abduction of the arm with the patient in the Trendelenburg position. It appears immediately after recovery from anæsthesia, and may vary in extent from simple paræsthesia of portion of the fingers and hand to involvement of almost every component of the plexus. The ultimate prognosis is good, but recovery is tedious. The causes and contributing factors are many and diverse and may be summarized as follows:

1. Direct compression of the plexus in the root of the neck is caused by a badly adjusted or poorly padded shoulder rest. The condition has a tendency to repeat itself on the same operating table from time to time.

2. Tension and stretching of the component parts of the plexus, causing ischæmia, are the most important ætiological elements.

3. Fixation of the shoulder girdle by poorly adjusted shoulder rests, whilst the arm is abducted, increases such tension.

4. The nerve trunks of the plexus are stretched over the head of the humerus. This is rendered much more prominent with abduction of the arm, the tension on the nerve trunks being substantially increased. This anatomical fact can readily be observed during dissection of the axilla, in the performance of radical mastectomy.

5. The steeper the Trendelenburg position and the heavier the patient, the greater the tension will be.

6. The use of the relaxants in recent years is responsible for a greater incidence of the accident by removing normal muscular support from the shoulder girdle and allowing the torso to slip lower down between the shoulder rests, thus increasing the tension on the plexus.

7. Accidental increase in the angle of abduction of the arm, by pressure from the surgical assistant or spectators, increases the risk of damage. The double abduction board is specially dangerous in this regard, as increased adduction on one side implies increased abduction on the other.

8. Drawing of the head and neck to the opposite side increases tension on the plexus.

9. Stretching of the plexus is greatest with the arm abducted, extended and in extreme supination.

10. Sloping shoulders, more characteristic of the female form, increase the probability of damage to the plexus (Ewing, 1950).

Every care must be taken to avoid this distressing and embarrassing condition, although the ultimate prognosis is generally good. For its prevention, the following suggestions are made:

1. That abduction of the arm with the patient in the Trendelenburg position should be avoided as far as possible. The best place for the arms in this position is at rest by the side.

2. That the external jugular vein may well be used for intravenous therapy in most cases. I have made a practice of this manœuvre on many hundreds of occasions, and it is not an unusually difficult one. It has been, in my experience, quite a safe procedure. Veins on the dorsum of the hand may also be used by flexing the patient's forearm across the chest. This, however, may be an embarrassment to respiration and a hindrance to the surgeon.

3. That the use of the double arm board should be avoided.

4. If the abducted arm must be used, that the body weight should be supported by well-padded shoulder rests, adjusted so as to take the weight upon the region of the acromio-clavicular joints and not in the root of the neck or the supraclavicular region. The degree of abduction should be the minimum consistent with the comfort of the surgical team and should never exceed 75°. The arm should be fixed by having a stool arranged under it to act as a support, and finally the extended arm should be fixed in full pronation.

Fires and Explosions.

Fire and explosions, as accidents in anæsthesia, offer many avenues for discussion over a very wide field, which time does not permit here. However, it is worth while to recount a few of the salient facts relative to this disastrous type of accident.

It is necessary, of course, to have in the anæsthetic assembly an inflammable liquid or vapour in sufficient quantity, and a source of heat to raise the liquid to flash point or the vapour to ignition point, before a fire or explosion can occur.

As ethylene and acetylene are not now commonly used, ether and cyclopropane remain as the dangerously combustible anæsthetic agents. Ether vapour is highly inflammable, and forms highly explosive mixtures with the commonly used gases, its explosive potency ascending sharply according to whether it is mixed with air, oxygen or nitrous oxide and oxygen. Impure ether containing peroxides ignites at 100°C., whereas pure ether requires a temperature of 180°C. for ignition. Ether vapour, being heavier than air, tends to form a layer close to the floor. It ignites in concentrations of 3% to 9% and explodes in concentrations of 19% to 34% (Low, 1951).

Ether burns with an intensely hot blue flame, and an ether fire of any dimensions is a truly terrifying ordeal, as I know from personal experience. Cyclopropane is explosive and inflammable in concentrations of 3% to 50%, this

range including well within its scope the concentrations ordinarily used in anæsthetic practice. Cyclopropane also is heavier than air. Theoretically, cyclopropane mixtures leaking from the anæsthetic assembly may ignite, but in practice such leaking gases rapidly become diluted below the point where ignition or explosion is possible, and, in any case, the source of heat must be within one foot of the leak.

It is well to remember that in the absence of a cuffed endotracheal tube explosive gas mixtures may enter the stomach, where ignition by the diathermy current is a poignant risk. Sources of heat may be electrical or non-electrical, such as fires, open radiators, cigarettes and matches. Oxygen under high pressure in the presence of oil or grease is an example of spontaneous heat.

Electrical sources of heat consist of the following:

1. Electric current producing actual sparks, or dangerous heating of inflammable gas mixtures by lamp filaments in endoscopic instruments. Endoscopic bulbs supplied via a rheostat from the mains are readily able to heat inflammable gases to a degree sufficient for explosion. Those depending on dry batteries are without risk in this respect (Low, 1951).

2. Static electricity due to friction in any shape or form. It is favoured by a cold, dry atmosphere with a high atmospheric pressure. In Australia we are accustomed to consider that such favourable conditions rarely obtain. We have, in truth, been singularly free from fires originating in this manner; but expert opinion is that this is more by good fortune than by good management (Australian Society of Anæsthetists' News-Letter, June, 1952). Suitable conditions evidently exist at times in both Western Australia and Tasmania, the sparks, however, being smaller than elsewhere in the world, but sufficiently large to cause an explosion.

3. The electrocautery and diathermy electrode.

The following precautions are suggested: (i) Operating theatre floors should be covered with conductive material and well grounded. (ii) The humidity should not be below 50%. (iii) Anæsthetic apparatus should be earthed by two dragging chains. (iv) Operating theatre personnel should be clad in conductive clothing. (v) All switches should be not less than three feet from floor level, and suction machines should be housed outside the operating theatre. (vi) Care should be exercised by all in smoking, and in the handling of matches.

Accidents in the Immediate Post-Operative Period.

Chief among accidents in the immediate post-operative period are those due to faulty nursing positions, leading to obstructed airway and death from asphyxia. The patient should not be nursed lying flat on the back during the immediate post-operative period. The semi-prone position is the only safe one for the unconscious patient, as it throws the tongue and the floor of the buccal cavity forward, maintaining a patent airway automatically.

Excessive sedation, before or after operation, may lead to dangerous respiratory depression in the immediate post-operative period. This may be intensified if the anæsthetic agent used is a depressing one such as thiopentone or cyclopropane. Pethidine and morphine are being increasingly used as analgesic adjuvants in general anæsthesia, and their use in this way usually implies a lengthy period of sedation and analgesia following operation. Further sedation may in such cases be uncalled for, for many hours. Heavy premedication, such as that with "Omnopon" and "Scopolamine", is indicated in only the most major procedures, and its use otherwise accounts for many unpleasant shocks in the post-operative period.

Post-operative injections, designed to produce analgesia by intercostal or paravertebral blocking, are, in my experience, of doubtful value and carry the added risk of pleural puncture producing pneumothorax, or of entry of the anæsthetic solution into the spinal theca, with disastrous results.

Mouth packs and gauze packing may through oversight be left *in situ* and discovered under more or less dramatic circumstances, after the patient's return to bed. Extreme care and double checking in the use of these devices are essential for safe working at all times.

It is a matter for regret that many of our nursing sisters are ignorant of the salient features of immediate post-operative care after modern anæsthesia, and indeed the nursing trainee of today receives no organized instruction in such matters. If such instruction were given, a great deal of scope for misadventure in the immediate post-operative period would be considerably reduced.

If we are to keep the accident rate in anæsthesia down to a minimum, there must be a realization by all concerned with surgical work that the anæsthetist, apart from his essential and fundamental part in the surgical team, is a dealer in highly lethal drugs and intricate procedures, and that death and disaster are never far distant; that it is incumbent upon every other member of the team to exercise every care and to cooperate to the limit for the sake of the safety and welfare of the patient; and that constant vigilance and concentration are the duty of everyone connected with the administration of the anæsthetic.

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THE TREATMENT OF CARCINOMA OF THE PROSTATE WITH A NEW ŒSTROGEN, "TACE".

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A SHORT ten years ago the treatment of carcinoma of the prostate was very simply discussed. In those rarer instances in which the carcinoma appeared to be confined within the capsule of the gland, radical removal was a possibility. Short of that, treatment resolved itself into the relief of symptoms: endoscopic resection or cystotomy was used for obstruction or hæmaturia, and radiotherapy, chordotomy, or sedatives for the relief of pain; but the picture was not a pretty one.

At the present day, one could literally talk and argue for hours as to the correct method of treating malignant disease of the prostate. At the one extreme it is recommended that all men aged under seventy-five years with benign prostatic enlargement should undergo total prostatectomy in an attempt to cure the possible occult carcinoma. At the other end of the scale the oral exhibition of œstrogen will dramatically relieve the patient of his distressing symptoms for varying periods of time (two of my patients are well at the end of ten years). In between

these extremes are found advocates for total prostatectomy in those cases in which the capsule has not been penetrated by the growth, or total prostatectomy when the exhibition of œstrogen has reduced the size and infiltration of the prostate sufficiently to make this appear feasible. Injection of radioactive substances into the malignant prostate exposed retropubically is also being used, and, on a lesser operative scale, orchidectomy or orchidectomy together with the use of œstrogen. In œstrogenic therapy the dosage varies from one milligramme to hundreds of milligrammes a day. Antiandrogenic therapy may be instituted on diagnosis by some even in the absence of symptoms, or in the presence of exaggerated symptoms only by others. It is stated that resistance to œstrogen may develop reasonably early during treatment, and it is suggested that it is better therefore to withhold the exhibition of œstrogen until some symptoms become pressing.

There is some argument as to whether the effects of the different œstrogens are frankly antiandrogenic or whether some other factor as yet unknown is involved. In this regard it has been reported by Trunnell and Duffy (1950) that, whilst the exhibition of the small doses of œstrogens produces amelioration of symptoms, a very large dosage has resulted in increased pain and elevation of acid phosphate levels.

The dramatic changes that take place under œstrogenic therapy are well known. Not only do the pressing clinical symptoms disappear and the metastases retrogress, but microscopic examination of sections of the prostate after treatment may reveal no evidence of carcinomatous cells, but rather a washed-out structure of large enucleated cells, ghosts of their former selves. If this apparent cure is so definite, it must be queried why, if the dosage of œstrogens is maintained in any one patient, the growth should again become active and the symptoms recur. It is now regarded as definite that at least a contributory factor, if not the real cause of the relapse, in prostatic carcinoma on older œstrogenic therapy, is hyperactivity of the hormonal phase of adrenal function. Actual hyperplasia of the adrenal has been reported from autopsy findings in a subject who died in such a relapse (Smith, Rush and Evans, 1951).

It has been proved experimentally that the continuous administration of the usual œstrogens to laboratory animals causes enlargement of the pituitary and the adrenal glands (Shipley and Meyer, 1952). Should such adrenal hyperplasia occur in males under ordinary œstrogenic theorapy, an explanation would be available as to why œstrogens fail to produce permanent improvement, and why the usual clinical picture of dramatic symptom remission is followed at some later date, near or far, by relapse.

In the search for œstrogens that did not have this stimulating effect on the adrenal and pituitary at all or to the same degree as the œstrogens therapeutically employed at the present time, studies have been made with an œstrogen, tri-p-anisylchloroethylene. This substance has been produced by The Wm. S. Merrell Company, of Cincinnati, Ohio, under the trade mark of "TACE".

The œstrogenic potency of "TACE" has been demonstrated conclusively in experiments on animals and in extensive clinical studies. From castrated female rats to which "TACE" was administered, typical œstrogenic vaginal smears were obtained (Thompson and Werner, 1952). In castrate monkeys the exhibition of "TACE" was followed by a definite œstrogenic effect, as evidenced by a high percentage of fully cornified epithelial cells in vaginal smears and the typical bright red appearance of the sex skin (Gray, 1952). In women after the menopause "TACE" produced the cornification which typically follows the administration of other œstrogens (Rothchild, 1952).

Although "TACE" produces these characteristic œstrogenic effects, experimentally it has several important differences from stilbœstrol and hexœstrol. The difference in effects upon other glands after continued administration is striking. "TACE" decreases and hexœstrol increases the weight of the pituitary gland. "TACE" causes a slight increase and hexœstrol a pronounced increase in the weight of the adrenal. In experiments performed by Thompson and Werner (1952), in control rats the average weight of the pituitary gland was 12·4 milligrammes; after the administration of "TACE", the average weight was 8·5 milligrammes, and after the administration of hexœstrol it was 27·9 milligrammes. The weight of the adrenal gland in control animals averaged 23·1 milligrammes; after the administration of "TACE" the average weight was 25·9 milligrammes, and after the administration of hexœstrol it was 37·4 milligrammes.

In animals it has been found that "TACE" is long-acting when given in either large oral doses or comparatively small subcutaneous doses, and short-acting when given in small oral doses. The effects of hexœstrol and stilbœstrol are short-lived, no matter how the manner of administration is varied. Five milligrammes of "TACE", an equivalent of 238 rat units, given orally, produce vaginal œstrogenic smears up to seventeen days; five milligrammes of hexœstrol (415 rat units) or five milligrammes of stilbœstrol (1666 rat units), produce effects for three days only. The results of the subcutaneous injection of "TACE" are far more striking, effects from one milligramme given by this route persisting for up to fifty-three days.

This prolonged effect, particularly by oral administration, suggests tissue storage. An investigation of the œstrogenic concentration in body fat has been made after the administration of "TACE" and hexœstrol (Thompson and Werner, 1952). No evidence of any storage was found with hexœstrol, but one day after the oral administration of 15 milligrammes of "TACE" to rats, a concentration of 11·4 milligrammes of œstrogen per 100 grammes of body fat was obtained. Subsequently, after five days 5·9 milligrammes, and after ten days two milligrammes, per 100 grammes of body fat were isolated.

From a clinical point of view the period during which I have been using this drug is relatively short and the number of cases correspondingly small. It was thought that the best method of attack in the initial stages of study would be to use "TACE" in cases of prostatic carcinoma in which previous treatment with the œstrogens had been given, in which a relapse had taken place, and in which no further improvement could be achieved with œstrogens commonly used. Very few of these patients had been subjected to castration.

These regressions gave rise to various clinical pictures, of which the painful manifestations of backache, root pains and sciatica were probably the most common. Increasing obstruction as evidenced by diminution in the urinary stream, difficulty of micturition *et cetera* produced another group. In two instances, paraplegia was produced by the collapse of the vertebræ involved by metastatic phenomena, and in others increasing loss of weight, pallor *et cetera* gave indication of a retrogression of the neutralizing effects of the œstrogens used. In other cases, the change made to "TACE" was because of the painful and embarrassing manifestations of gynæcomastia.

The most striking cases seen in this series were those associated with paraplegia; in two such cases results of considerable value were obtained. The first of these patients obtained improvement for five months with loss of pain, the presenting symptom, and then died suddenly.

The second patient is still alive. In April, 1948, a cystotomy was performed by another surgeon and a diagnosis of carcinoma of the prostate made. The patient was examined by the writer ten months later and after an endoscopic resection the suprapubic sinus closed. Examination of sections at that time confirmed the diagnosis of carcinoma. He remained comparatively well during large doses of stilbœstrol until June, 1951—some twenty-seven months. His physician then reported that, two weeks before, he had suffered paraplegia and that his urinary difficulty was becoming extreme. Ten days elapsed before his admission to the hospital, and in that period of three and a half weeks he was given large doses of stilbœstrol without result. On his admission to the hospital he was completely paralysed in the lower limbs and his suprapubic wound had broken down. Suprapubic drainage was reintroduced and he was given "TACE", 24 milligrammes per day. Within a month there was considerable improvement; movement appeared in his legs, which progressively improved until at the end of another month he was able to walk to his front gate. Some six months ago, his doctor in the country reduced the dose

to 12 milligrammes per day. Almost immediately, his legs became a little weaker, but when the larger original dose was reinstated the condition of his legs improved, and he is still able to walk about and is free of any other symptoms.

The painful phenomena which developed after treatment with stilbœstrol for varying periods of time, and in some instances were not relieved by the increase in dosage, have almost invariably been relieved by the exhibition of "TACE".

Reports of Cases.

H.R.D., aged seventy-one years, had carcinoma of the prostate diagnosed in February, 1950, as a result of rectal examination. At that time he complained of high sacral backache with stilbœstrol therapy. A clinical remission was obtained, but five months later the patient reported with the story that his backache had recurred and that his gums were too sore for him to wear his dentures. At this stage, he was given "TACE", 12 milligrammes (one capsule) per day, and two months later he reported that his gums were very much better after taking the new capsules and that his backache had disappeared. Eighteen months later his prostate was softer, but still irregular, and apart from persistent slight hæmaturia he was symptom-free.

A.T.B., aged seventy-seven years, was first examined in 1947, with a history that he had undergone a suprapubic prostatectomy ten years previously. Six years after this, a further portion of prostate was removed, and up until five weeks prior to the first examination he was well. He then complained of pain in the pubic region and rectum. He was examined once only, but reported again two and a half years later with severe obstructive symptoms and an increase in his pain. At this time the prostate was still small but very hard. He was given trial doses of stilbœstrol with relief of his obstructive symptoms, but he still complained of pain. Fifteen months ago he was given "TACE", and three months later the pains had disappeared and his prostate was small and soft. In October, 1952, there were no obstructive signs or pain and the prostate remained as has been previously indicated.

R.H., aged seventy-five years, was first examined in June, 1950, having been taking stilbœstrol for four months in larger and smaller doses. A severe radiating ache in his right buttock had not been relieved by the increase in dosage and his obstructive symptoms had again become more obvious. The exhibition of "TACE" produced a rapid amelioration of his symptoms. When he was last examined, in September, 1952, his weight was constant, he had no delay on micturition or dysuria, he was free of pain, and the condition of his prostate was "grade II" and benign to palpation.

A further interesting story is given by J.S., aged fifty-five years. In September, 1948, this patient consulted his local doctor with the complaint of pain in the loin, for which an X-ray film was taken. This revealed evidence of gross metastases in the pelvis and lumbar vertebræ. He was given deep X-ray therapy and stilbœstrol, and a 50% reduction in the amount of his pain resulted. In July, 1949, from a slight fall he sustained a pathological fracture of his femur, and until September, 1950, when he was given "TACE", he suffered intermittent attacks of pain and hæmaturia, and towards the latter part of this period he lost a considerable amount of weight. In September, 1950, when he was given "TACE", he rapidly gained 14 pounds in weight and felt much better. This state of affairs has been maintained up to the present time (October, 1952). This patient states that he "would have been dead eighteen months before if it had not been for this drug". He now complains of bilateral leg pains, and of œdema of one leg.

J.P., aged eighty-two years, was examined in August, 1949, when he was found to have gross enlargement of his prostate, which was obviously carcinoma. He had suffered symptoms of bladder-neck obstruction for five years. As this patient lives in another State, I have not seen him since the original diagnosis, but extracts from his letters to me are very illuminating. The results of stilbœstrol therapy in the first twelve months were quite satisfactory, his main cause of complaint being that the three tablets a day (one milligramme) took the hair off his arms and chest and even off his eyebrows. The next communication was sent three weeks after he had begun "TACE" therapy. When he had taken 16 capsules, he reported that he was feeling much better; he could walk much better and was not so tired. A letter from his son in May, 1951, makes the following statement: "In January of this year he changed back for 10 days to the former prescription [stilbœstrol]. When I got home he was very white and obviously not too well, but on returning to the capsules ["TACE"] in two or three days he changed completely, his colour returned and he became brighter and happier, and at 83 he drives himself both on business and pleasure and he works around the house and the garden. He voids twice between 10:00 p.m. and 8:00 a.m."

Comment.

One of the most distressing features of œstrogenic therapy has been the development of gynæcomastia. The large, painful breasts and tender nipples in people who take stilbœstrol over a long period of time often compel the reduction of the dosage, or the patient himself will cease taking the drug. The exhibition of "TACE" has invariably resulted in an amelioration of these distressing signs and symptoms. When "TACE" is being exhibited immediately after diagnosis, no evidence of feminization has been found in most cases, and in the very few in which a degree of breast enlargement has occurred, this has been very slight. In none of the cases mentioned in this discussion had the operation of orchidectomy been performed. Whilst it is realized that statistically better results are obtained by the combination of orchidectomy and œstrogenic therapy, various considerations have prevented my employing this procedure. The hospital position is such that long delays are necessary in most cases before any operation can be attempted even for urgent considerations, and it is thought that the more benign lesions must take preference in the allotment of hospital beds. Furthermore, an orchidectomy often demands an explanation to the patient of the nature of the pathological condition from which he is suffering. In view of the fact that amelioration of symptoms can be achieved so readily and in most cases so completely with œstrogenic therapy for a long time, it seems to me a pity to have to inform the patient of the nature of his disease until it is absolutely necessary. Further, from the psychological viewpoint, no man, no matter what his age, views with complacency the losing of testes. Even though œstrogenic therapy alone may mean a termination of his life a few months sooner, the total end result may be more desirable. Again, in the establishment of a new drug it was held that an assessment of it on its own virtue would be more valuable than an assessment of its use in combination with some other manœuvre.

In an attempt to correlate the experimental with the clinical viewpoint, it would appear that the property of fat storage exhibited by "TACE" may be the real explanation why this œstrogen is able to produce its result over a longer period of time. "TACE" is liberated slowly from the fat, and in this way the prostatic cancer patient may develop a more constant level of œstrogenic stimulation, which is more effective than the varying amounts of stimulation which follow the ingestion of one of the less rapidly acting œstrogens.

Summary.

In summary, I believe from my short experience that in "TACE" we have an œstrogen of considerable value in the treatment of carcinoma of the prostate. It has proved in my hands to be practically free from the toxic results which at times follow the use of the other œstrogens. Furthermore, in view of the cases presented, and many others, one feels that its activity in controlling the symptomatic results of prostatic carcinoma is more prolonged and greater than that of the œstrogens up to now in common use.

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COMMON EYE DISEASES IN GENERAL PRACTICE.[1]

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THE subject of tonight's talk should probably be considered as providing an opportunity to discuss eye problems in general practice, both diagnostic and therapeutic. A number of colleagues in general practice have given me their views on what these problems are, and to balance the line of battle the ophthalmological experts have also weighed in with their thoughts. Now perhaps unfortunately the symbol of the budding doctor is the stethoscope, never the ophthalmoscope; this fact, coupled with the usually rather cursory eye teaching given to undergraduates, gives most of us very little grounding in eye diseases, or any idea of how common they are in general practice, or of how important they are to the patients. Perhaps you will forgive me therefore if tonight's remarks seem to some of you simple and dogmatic; but a little dogma may produce a clear picture, and after all the Scots are a very simple race.

One of the most frequent "problem patients" in practice is the man or woman with a headache. Can this headache be due to the eyes? At the outset it should be clearly stated that the eyes are not a common cause of headache, and are grossly over-estimated as such by physicians and the lay public. The panacea of glasses is much abused.

Once you have excluded glaucoma, iritis and obvious disease, when should refractive errors be considered as the cause of your patient's symptoms, and how can you reach a decision?

Eye headaches are recurrent headaches directly related to the use of the eyes. There must be some correlation between reading, writing or other detailed use of the eyes and the discomfort. Cinema and motor-car driving headaches are atmospheric and postural. Morning headaches are often hypertensive. The true eye headache comes on during or soon after the concentrated use of the eyes.

Once a reasonable supposition has been established from the history, I think that further advice should be obtained. It is probably quite useless to test the vision in your surgery. The presence of defective vision is no guide. The severely myopic patient seldom has any trouble. A small astigmatic error allowing almost normal vision may cause acute headache. Remember occupation; an accountant studies decimal points, a farmer haystacks.

Before I leave this difficult subject, let me say a word on migraine. All migraine subjects should have their eyes examined, since although it is quite certain that refractive errors do not cause this distressing complaint, their correction may often reduce the severity or frequency of the attacks. Friedman's recent little book can be recommended with particular reference to its relegation of the ocular cause of headache to a minor place in the general study of headache.

Blepharitis can be a problem. Acute blepharitis is an acute pyogenic infection and should be dealt with firmly by antibiotics. The patient with chronic blepharitis and scruffy red-rimmed eyes is a different kettle of fish. Often there is a nervous element and sedation is indicated. Always check the scalp for seborrhœa, and have it shampooed clear. Ethereal or spirit soap shampoo should be used and "Albucid" ointment applied to the lids several times daily for weeks. Penicillin is less effective. If you feel energetic, paint the lash-bearing area daily with triple dye, using an ordinary water-colour paint brush. This may be anti-social, but can be very effective. In persistent cases errors of refraction should be considered.

Closely associated, of course, is conjunctivitis. This is a vexed subject, because it is in the diagnosis that we make our mistakes. The ordinary acute attack is characterized by moderate discomfort usually of a gritty, burning or sandy type, by redness of the conjunctiva and by some degree of discharge. It is never associated with the severe pain of glaucoma, the photophobia of iritis or the dimness of vision of both. The patient is therefore fairly comfortable, he can stand the light, he is not in severe pain, he has not an aching pain and he can see well. It is the failure to consider these three points—pain, fear of light and dimness of vision—that causes so many unfortunate mistakes.

Once a diagnosis of acute conjunctivitis has been established, the first thing to remember is that it is contagious. Advice about pillows, towels, face cloths, hand washing and so on should be given. Use penicillin or aureomycin. Do not use irrigations, do not use boracic acid, do not use "Argyrol". Have a drop put into the eyes every half hour for three days. If the condition is not greatly improved by the fourth day, then the diagnosis is probably wrong. Check it. Is the cornea clear? Is the pupil round and even? Can the patient see? Does the light bother him? If you are satisfied, go straight over to the use of sulphacetamide every half hour. I doubt if in any case genuine conjunctivitis will fail to clear with one or other of these methods.

There are two other very trying forms of conjunctivitis. The angular type, with its itchiness at the corners, mild injection and white foamy discharge, should be treated with 0·5% zinc sulphate drops and zinc oxide ointment well rubbed into the skin at the canthi. The diplobacillus lives in the skin, secreting a proteolytic enzyme which causes the irritation. The root of the trouble must be attacked in the skin, and the use of drops alone which is the common treatment, can have only a transient effect. Propamidine is sometimes effective.

The granular type, common in children, can be diagnosed by the roughness of the lower fornix with mild injection and lachrymation. It is probably allergic. Good hygiene and diet are essential, the use of "Neosynephrin" (0·125%) seems to help.

At this stage it may be well to say something of the drugs used in modern ophthalmology, and how to use them. Most of them are surface-acting, and it is worth recollecting the rapid washing action of the tears. For this reason the instillation of, for example, aureomycin three times a day would be almost useless if not actually unwise in its encouragement of resistant organisms. These drugs must be used persistently and intensively. In practice, application every half hour is usually possible; ideally they should be applied every ten minutes or even oftener. "Three times a day" is an anachronism.

The most valuable new drug we have is probably cortisone. It may find its greatest use in ophthalmology, but at the moment it is scarce and can be applied only in special cases.

Sulphacetamide is almost certainly of more general value than the antibiotics. It should be used in 10% strength, and not in the stronger concentrations so commonly prescribed. It is the drug of choice in corneal conditions, in which it is much more effective than penicillin.

For pyogenic infections, penicillin, aureomycin and the rest should be exhibited. It will be appreciated that the conjunctival flora is quick to develop resistance, and casual or intermittent use must be avoided. Penicillin at 2000 units per millilitre and aureomycin at 0·5% or 1% are adequately strong. They lose their potency very quickly and should be kept cool.

Surface anæsthesia has for long meant the use of cocaine, but "Decicain" (1% solution) is better. It stores well and scarcely damages the epithelium of the cornea. It is ideal for the removal of foreign bodies.

"Butyn" and "Metaphen" ointment helps to reduce discomfort after removal of a foreign body.

A word on "Argyrol". It is harmless unless used for prolonged periods, when it stains the conjunctiva. Its bactericidal properties are almost nil.

Never use atropine in general practice. However, as this advice will be ignored, use it only in *herpes zoster ophthalmicus*, iritis and severe corneal ulceration. There are more tragedies from its use than from its disuse.

I believe that the routine application of sulphacetamide after the removal of corneal foreign bodies is justifiable. The anti-histamine drugs are on the whole disappointing.

[1] Read at a meeting of the Western Australian Branch of the British Medical Association on November 19, 1952.

To discuss specific problems a start must be made somewhere, and those of childhood can be taken first. Of these, *ophthalmia neonatorum* is becoming less common, and it is doubtful if routine prophylaxis is now required. However, silver nitrate, which is cruel, and "Argyrol", which is of doubtful value, are still being used. Sulphacetamide is undoubtedly the drug of choice.

The next common problem in infancy is the persistent sticky or watery eye; this is almost certainly caused by a blocked tear duct due to incomplete development of the naso-lachrymal passage. Local sepsis should be prevented by the instillation of "Albucid" drops and firm pressure applied by the tip of the little finger over the tear sac four or five times daily. This should be carried out for several weeks, probing and syringing being regarded only as a drastic and dangerous last resort. In approximately 90% of these cases the condition will clear up with conservative treatment.

The superstitious fears of the evil eye are scarcely more ridiculous than some of the muddled thoughts still prevalent concerning the strabismus of childhood. A most excellent review of modern practice in this condition was recently published by J. Ringland Anderson (1952) for those who wish to study this problem. However, I wish to emphasize one point only, which is that it is never too early to consider the treatment of a squint, and that all patients, as soon as the condition is noticed, should be referred to the ophthalmologist. Let there be no nonsense about waiting until the child is four or five or six years old.

Eye surgery is a very specialized business; but there are three operations which many general practitioners carry out—those for the removal of tarsal cysts, pterygia and foreign bodies. Tarsal cysts are easily dealt with. The eye is anæsthetized with "Decicain", the lid is injected with a local anæsthetic agent through the anæsthetized conjunctival surface, an incision is made at right angles to the lid margin with a Bard Parker number 15 blade, the cutting edge being directed away from the eyeball, and the cyst is then curetted and the eye covered for twenty-four hours. The safety of this operation lies in the fact that it is not an operation on the eye.

Now at the risk of a good deal of criticism, it is my firm belief that neither pterygia nor central corneal foreign bodies should be touched. Many agree about the pterygium. Its removal is a difficult little operation and recurrences are frequent, whereupon the surgeon gets the blame. With regard to foreign bodies, those involving the central cornea directly affect the sight of the eye and the slightest false step may lead to considerable loss of vision. Where specialized attention is not available, however, the foreign body must be removed by the man on the spot. How should this be done?

As the majority of such injuries are caused while the subject is at work, compensation and legal complications may arise. For this reason the taking of a short history and a record of the visual acuity of each eye are essential before any attempt at removal is made. The patient is supine. You have a good light. You have some form of magnification. With a sharp needle—an ordinary hypodermic needle is excellent—the foreign body is levered out. It is not scraped out with a spud (which would have removed a large area of corneal epithelium), because fortunately you do not possess such a crude weapon. If a rust ring remains, a small dental burr will get rid of it. If during the process the patient will not keep his eye open, tell him to open the other eye and to hold his hand in front of his face and look at it. Put in some "Albucid" or "Butyn" and "Metaphen" ointment and pad the eye. Examine it again in twenty-four hours.

If the history of something entering the eye includes any reference to hammering, always assume that there may be an intraocular foreign body. There are far too many tragedies through neglecting to inquire on this simple point.

A progressively more serious view is being taken of injuries due to blunt instruments, usually balls of various kinds, in which blood appears in the anterior chamber. Always treat such a hyphæma with caution. Keep the patient in bed in a dark room and obtain further advice. Do not touch patients who have an iris prolapse.

In chemical injuries tissue destruction is usually rapid, and immediate irrigation with the nearest bland lotion should be carried out without wasting time on antidotes or neutralizing lotions. Lime burns are the most dangerous, and the damage is nearly always much worse than appears at first. In dealing with such a case, first anæsthetize the eye with "Decicain", not cocaine, remove all loose fragments and lubricate the eye with a large quantity of castor oil or mild antiseptic ointment. Then send the patient on to an ophthalmologist.

Injuries from twigs or finger nails are often very stubborn. Flash burns respond well to "Neo-synephrin" (0·125%).

I have mentioned *herpes zoster ophthalmicus*. The fifth cranial nerve supplies the iris, and it should be assumed that in all cases some degree of iritis is present. Atropine must therefore be instilled and the pupil kept dilated.

A word about cataract. There is some misconception concerning the degree of blindness which must be reached before operation. With the general use of the intracapsular technique the lens can be extracted much earlier than some years ago, so that the patient can be comforted by the assurance that blindness is not necessary before he can be given relief.

Now let me give a final brief digest of the diagnosis of the "red eye". Remember three conditions: conjunctivitis, iritis, glaucoma. Remember three points: pain, light, sight. Concentrate on the severe pain causing vomiting, dim vision and enlarged pupil of glaucoma. Consider the dull ache, the fear of light and the small pupil of iritis. Relax when your patient complains of discomfort, when he can see well, and when he can gaze easily out of the window with his conjunctivitis.

Conclusion.

In closing, I would give you the classic reminder that though we bury our medical and surgical mistakes, the one-eyed patients, like the poor, are always with us.

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CYSTIC DISEASE OF THE LUNGS.

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CYSTIC DISEASE of the lungs is taken to include all conditions not caused by a specific agent in which lung parenchyma has been replaced by clearly defined spaces. Dermoid cysts are not included.

Historical Survey.

The first recorded case of a lung cyst seems to have been that of a child described by a certain Thomas Bartholinus in 1687. However, prior to 1925 references to this disease were scanty, particularly in the literature of English-speaking countries.

In 1925 Koontz discussed cystic disease of the lungs in a widely quoted article. In a search of the literature he was able to find records of only 108 cases, the total including such conditions as diverticula of the trachea and main bronchi, solitary cysts of the trachea and bronchial wall and cysts of aberrant lung tissue; the majority of these cases had been described in German literature. Koontz added one case found by himself.

Ætiology and Pathogenesis.

The pathogenesis of cystic disease of the lungs has presented a particularly interesting problem.

Koontz (1925) recognized that in general there are two types of cavities: (*a*) bronchial dilatations, (*b*) cavities resembling emphysematous blebs. He also recognized that there were many variations and gradations of these two types.

Considerable discussion has centred round the question of the congenital origin of lung cysts.

Koontz (1925) stated that it would often be difficult to determine whether a cyst was congenital or acquired, were it not for the total lack of pigment in congenital forms. Wood (1934) also stressed the absence of pigment as being indicative of a congenital origin. However, Moersch and Clagett (1947), in referring to this point, state that "Dickson has demonstrated that this feature cannot be relied on as a basis of differentiation".

The presence of an epithelial lining in a cyst has been widely accepted as evidence of a congenital origin. Gross (1946), in referring to the presence of an epithelial lining, said: "This histological feature positively identifies the cyst as being congenital in origin."

W. Burton Wood (1940) stated that the cysts appear to result from a failure of the extremely complicated system of lung budding, which should proceed until the final alveoli are formed. The budding stops prematurely whether earlier or later, and the terminations of the already formed bronchi apparently swell and thin out to occupy the spaces where pulmonary parenchyma should have developed, and dilated bronchi take the place of the alveoli.

In 1946 Klosk, Bernstein and Parsonnet discussed the pathogenesis of lung cysts. Acquired cysts according to these authors usually result from some condition such as a respiratory infection, chronic bronchitis or bronchial asthma. A small bronchus or bronchiole becomes partly occluded, so that air passing the obstruction during inspiration is to a greater or lesser extent trapped as the bronchus narrows in expiration. The alveoli with which the bronchus is connected stretch, and finally rupture, a number of the air cells are thrown into one another, and cystic formation commences.

These authors also attempted an explanation for the occurrence of congenital cysts. They recalled that the lungs develop from lung buds which by about the fourth week of fœtal life have become lobulated, three lobules forming on the right side and two on the left. These lobules undergo dichotomous division to form the bronchial tree, the terminations of the final subdivisions becoming expanded into atria. At about the sixth month the alveoli are formed as evaginations of these atria. It was suggested that if for any reason development of the bronchial tree should be halted at an early stage large single cysts result; if the disturbance of development occurs later, multiple smaller cysts may follow. It was pointed out that the thoracic cage grows at a much faster rate than the developing lungs, so that if the pulmonary parenchyma in the affected area does not develop normally, conditions are then favourable for the relatively unsupported bronchi to be drawn out into cystic dilatations as the thorax enlarges. A contributing or associated factor may be, it was suggested, that the bronchiole is arrested at the tube stage. Mucus may be secreted into the lumen and cause distension of the tube into fluid-filled sacs. Ultimately the sac may rupture into a bronchus, air now entering the cystic space; this in turn dilates, particularly if a check-valve mechanism should operate at the bronchial orifice.

This theory may indeed explain the mechanics of development of many congenital cysts; however, it does not explain the fault in development.

Koontz (1925), in discussing his own case, that of an infant who died at the age of twelve days, states that he found a constriction of the walls of the bronchiole with dilatation of the parts distal to it, but was not able to explain the excessive development of the mucous membrane which formed the constriction.

Pryce (1946) has offered an explanation for congenital cysts in the special case of the sequestrated lung segment. In this somewhat rare developmental abnormality a bronchopulmonary mass is found in the postero-medial portion of a lower lobe (usually the left), more or less completely dissociated from the normal bronchial tree. In seven cases reported by Pryce the condition of this lung mass varied. In some cases it was composed of normally differentiated but bronchiectatic lung tissue; in other cases there was a large cyst of bronchial origin; in one case the mass was polycystic; in another case polycystic disease was present in other portions of the lung.

However, in all cases running into the lung mass there was a large anomalous artery derived directly from the aorta in the vicinity of the diaphragm.

Pryce (1946) suggested that a capillary network from this artery had enveloped the bulbous tip of a growing bronchus probably when the embryo was at the 10 to 14 millimetres stage, and by exerting traction as the developing lung shifted from its original position, had caused the tip to be torn off and to develop independently. Evidence of this traction was noted in one of Pryce's cases, in which a large bulbous cyst was present connecting the sequestrated segment to the remainder of the lower lobe. The nipped-off tip, composed of thin epithelium embedded in mesenchyme, would be damaged and the subsequent development abnormal.

This theory of development of the sequestrated lung segment has been supported by Bruwer, Clagett and McDonald (1950) and more recently by Kergin (1952).

Bruwer, Clagett and McDonald (1950) also suggested the possibility that anomalies of the intrapulmonary course of branches of a normally developed pulmonary artery might be a factor in the development of congenital cysts apart from the special case of the sequestrated lung segment.

It is unlikely that all congenital cysts are to be explained by a purely mechanical theory; nevertheless, many authors have noted the presence of large blood vessels in the walls of bronchogenic cysts.

Tosatti and Gravel (1951) have reported two cases of bronchogenic cysts in the apical segment of a lower lobe; in both cases a large anomalous artery arising directly from the aorta was found entering the cystic portion of the lobe. The authors did not believe that the abnormal vessels had a direct causal relationship to the cysts, but that the cystic changes and the anomalous vessels were the result of a common embryonic malformation.

It is possible that pressure by an abnormal artery may lead to local disturbances of nutrition with resulting irregular growth associated with cystic development.

Koontz (1925) made the following statement: "It seems useless to attempt a simple mechanical explanation for a condition which is evidently a developmental anomaly, and in the formation of which many unknown factors must be concerned."

In some cases the fault may lie in an inherent defect in the *Anlage* cells from which the bronchial tree is ultimately derived.

There are undoubtedly other factors of a vital character which play a part in individual cases.

The theory that all bronchogenic cysts are congenital was strongly questioned by Moersch and Clagett (1947). In presenting 44 cases they stated that essentially all lung cysts could be divided into two basic types, those that originated from the bronchial tree and those that were of alveolar origin. They stated that it was difficult to determine whether a cyst was congenital or acquired, even after thorough microscopic examination. From their own observations they were of the opinion that lung cysts, including those of bronchogenic origin, might be congenital or acquired.

Burgess Gordon (1948) suggested that with cicatricial change of the bronchial mucous membrane following some inflammatory condition there might develop gradual obstruction in the bronchus, and distally dilatation resulting in extension and thinning of the terminal bronchioles. He stated that a cyst might show combined development of ruptured alveoli with forward development and spreading of a bronchus in which the columnar epithelium was carried forward into the cavity as an inner lining. In certain cases there might be an underlying embryological defect combined with the mechanical influence of bronchial obstruction.

Brantigan (1949), in reviewing the position, stated that it was once thought that epithelization of the lining of a cyst indicated a congenital origin, but that it was now believed that in most cases that feature might be present in acquired cysts. He also stated that in true congenital cysts the epithelial lining might be destroyed by infection, so that that could no longer be taken as a reliable criterion.

Recently Mayer and Rappaport (1952) advanced a theory, based on the evidence that after birth the lungs continue to grow during infancy and childhood by developing new lobules and not merely by an increase in the size of the lobules present at birth. According to this theory lung cysts of all types may result from disturbance of the normal post-natal growth by metabolic diseases such as fibrocystic disease of the pancreas, hepatic and biliary insufficiency, xanthomatosis, and reticuloendotheliosis. In addition to well established cases of these diseases the authors believe that mild and subclinical cases occur not uncommonly and are responsible for the development of many cysts seen in later life. The interference with growth leads to hypoplasia with deficiency of bronchioles and alveoli. As the child grows, bronchiectasis or cystic formation may develop.

This theory virtually is an extension of the theory of Klosk, Bernstein and Parsonnet (1946) to apply to post-natal development.

Clearly the last word has yet to be said on the pathogenesis of lung cysts. They result from combinations of a number of factors vital and mechanical, some of which are known, some of which await elucidation. Nevertheless, the following working classification based on present knowledge seems to have a value:

1. Bronchogenic: (*a*) congenital, (*b*) acquired.
2. Alveolar: (*a*) congenital, (*b*) acquired.
3. Mixed type.
4. Cystic bronchiectasis.

Bronchogenic cysts have an epithelial lining resting on a basement membrane. The lining cells typically are ciliated columnar, but may be cuboidal or flattened squamous. As a result of infection the epithelial lining may be destroyed and the inner surface of the cyst will be denuded connective tissue. In the wall of the cyst may be found bronchial elements such as cartilage, mucous glands, smooth muscle and elastic tissue arranged in a disorderly fashion.

These cysts may be single or multiple. They may be found in the substance of the lung or be attached to the lung by a pedicle. They may contain air, fluid, pus or blood alone or in combination. They may or may not communicate with a bronchus. In many cases large blood vessels will be found coursing through the walls of the cyst.

In most cases it is not possible to state whether a given bronchogenic cyst is in fact congenital. In the development of congenital cysts vital and mechanical factors play a part in varying degrees; there are still gaps in our knowledge to be filled before the complete story can be told.

In the development of acquired cysts of bronchial origin, partial obstruction of a small bronchus associated with a check-valve mechanism seems to explain the mechanics of development in most cases; combined with this is a weakness in the wall of the bronchus below the obstruction; this weakness may be developmental or inflammatory in origin. Fibrocystic disease of the pancreas may be associated with pulmonary cystic disease. That metabolic diseases are a major factor in the causation of cystic disease of the lungs, as believed by Mayer and Rappaport (1952), is an interesting conception that awaits further evidence before it can be accepted.

Alveolar cysts, in contradistinction to bronchogenic cysts, do not have a distinct epithelial lining; the boundaries of these cysts are unaffected alveoli; in subpleural blebs the visceral pleura takes part in the formation of the cyst wall. Alveolar cysts may be single, but are more usually multiple. They vary in size from small blebs or bullæ too small to be discerned on an X-ray film to cysts of enormous size. In one case which came to autopsy, the largest cyst present was compared in size to a football. Alveolar cysts contain air.

Blebs result from rupture of alveoli immediately beneath the visceral pleura, air tracking along the tissue planes to separate the pleura from the underlying lung.

Bullæ result from rupture of alveoli deeper in the lung.

Blebs or bullæ may be congenital, but there seems to be little doubt that the majority of cysts of this type result from some condition, inflammatory or mechanical, leading to partial occlusion of a small bronchus or bronchiole, and develop in the way described by Klosk, Bernstein and Parsonnet (1946).

The causes of the obstruction are varied. In one case seen widespread cystic disease followed bronchopneumonia, apparently the result of partial occlusion of a number of small bronchi during the stage of resolution. In another case a large air cyst occurred as a complication of spreading inflammation from a lung abscess, which itself had rapidly resolved. One case was encountered in which a cyst followed an attack of pneumonitis. In another case following an otherwise successful intrapleural pneumonolysis, two large blebs appeared on the surface of the lung, presumably as the result of kinking of small bronchi as the lung relaxed after the freeing of the adhesions.

Metabolic disease in early childhood may account for some of these cysts.

In some cases of obstruction of a small bronchus, bronchus and alveoli may stretch together and cysts of mixed type result.

In cystic bronchiectasis, cysts with a diameter of the order of two to four centimetres are found as dilatations of bronchi affected by a true bronchiectatic process. The stromal elements in these cysts are arranged in a normal manner, in contradistinction to the disorderly arrangement of these elements in bronchogenic cysts.

Clinical Features.

Cystic disease of the lungs may be found at any age from infancy to late middle or old age.

A small cyst may be symptomless.

Symptoms may result from pressure consequent on enlargement of a cyst leading to breathlessness, which may be severe. In some cases a large portion of the thoracic cavity on both sides becomes occupied by cysts, and the patient is living on an incredibly small amount of functioning lung.

Infection of a bronchogenic cyst is common; the patient presents usually with the symptoms of pulmonary abscess. However, in one case seen of giant infected cyst, the patient had been admitted to hospital with the diagnosis of empyema. Drainage of an infected bronchogenic cyst never leads to disappearance of the cavity.

Alveolar cysts rarely become infected.

Repeated attacks of acute pneumonitis occasionally are related to an area of cystic disease.

A commonly presenting manifestation of cystic disease is spontaneous pneumothorax resulting from rupture of a subpleural bleb or bulla.

In general, any of the symptoms seen in chronic pulmonary disease may occur.

Hæmoptysis, which may be severe, is sometimes the presenting symptom. In one case hæmoptysis associated with repeated attacks of pneumonitis was found to be caused by an area of cystic disease.

The patient, a woman, aged forty-eight years, had had three episodes of acute pneumonitis during a period of eighteen months. Hæmoptysis was present on each occasion; in the last attack this was severe. With each attack an area of opacity was seen on the X-ray film in the left subapical region; this cleared at the end of each attack, leaving a few rather indefinite markings in the area. Tuberculosis was considered in the diagnosis, but tubercle bacilli were never found. A bronchogram finally established the basic condition.

Vomiting seems to be not infrequent, particularly in younger patients.

Untreated cystic disease in children, if at all extensive, is usually associated with poor physical development.

Physical examination may reveal signs of pulmonary disease, but usually no characteristic findings indicative of cystic disease. In some cases strongly suggestive signs are present.

One patient, a man, aged twenty-five years, complained of having had cough and shortness of breath for some months. On examination of his chest breath sounds were absent over the upper half of the chest on both sides; the percussion note was resonant in these areas. In a patient obviously not suffering from bilateral spontaneous pneumothorax these signs were strongly suggestive of bilateral cystic disease. The X-ray appearance indicated cystic disease of alveolar type involving the upper two-thirds of both lungs.

The most valuable information in diagnosis is supplied by X-ray examination of the chest.

A characteristic appearance is that in which the normal lung markings are replaced by a rounded or ovoid area of translucency, which may occur in any region of the lung; the margins of the area may be sharp, but often are rather indefinite. Lateral films sometimes indicate the outline of the cyst more clearly, and should always be taken in order to determine the limits of the structure.

A large cyst may completely fill the hemithorax and cause the heart to be displaced towards the opposite side. This type of cyst is sometimes confused with a spontaneous pneumothorax, in which the lung is completely collapsed and airless. If the outline of the cyst is not defined a small area of lung in the cardiophrenic angle may sometimes give the clue in cases of cyst. In pneumothorax the flattened collapsed lung can usually be distinguished. Tomography may help to differentiate the two conditions in doubtful cases.

The fine hair-line outline of an air-containing cyst is characteristic.

In bullous emphysema irregularly rounded shadows of varying size are present; sometimes these occupy the greater part of both lung fields.

The translucent areas of larger cysts of alveolar type are often traversed by linear markings, which probably represent the vestiges of partially destroyed alveolar walls.

In fluid-containing cysts the condition is represented by an area of opacity roughly rounded or ovoid; radiologically it is often impossible to differentiate these cysts from hydatid cysts.

A bronchogram is sometimes necessary to establish the diagnosis. If the cyst is connected to a bronchus, the opaque oil will enter the cyst and collect in the floor of the cavity. If

the cyst is not connected to a bronchus or if the opening is small, a filling defect only is shown.

In extensive bilateral disease a bronchogram is of academic interest, but is not usually necessary and may cause the patient considerable distress.

Diagnosis.

Diseases from which cystic disease may need to be distinguished include hydatid cyst, spontaneous pneumothorax, pulmonary abscess, empyema, neoplasm, dipahragmatic hernia and tuberculosis.

Hydatid disease must always be considered in any cystic condition in the lungs. Complement fixation and Casoni tests, if the results are positive, suggest hydatid disease, although a negative result to either of these tests does not exclude hydatid disease. When it is present, a wavy appearance at the base of the cyst due to separated ectocyst is characteristic of hydatid disease.

An infected pulmonary cyst may be impossible to distinguish from a pulmonary abscess without biopsy of the wall. Brantigan (1949) states that in general the symptoms of infected cyst are not so severe as in lung abscess. Adams (1949) makes the point that if in a case of suspected lung abscess the cavity does not decrease in size in spite of clinical improvement, infected cyst should be suspected. Whether a pulmonary abscess may become lined by epithelium from a communicating bronchus is still uncertain. Brantigan (1949) states that he has never had incontestable proof of this except when an abscess has been drained externally; conditions favourable for epithelization are then produced.

Tuberculosis is sometimes confused with cystic disease; however, if the latter condition is remembered as a possibility, mistaken diagnosis from this cause should rarely occur. In tuberculosis air-containing cysts may sometimes occur as a result of traction on a small bronchus by an area of fibrosis.

It may be impossible to distinguish some neoplasms from a fluid-containing cyst.

A bronchoscopic examination should be made in doubtful cases, although the findings from this examination will usually be negative in cystic disease.

In some cases the final diagnosis can be established only after thoracotomy.

Treatment.

A cyst in the lung is a potential danger. In addition to the chronic ill health often associated with the condition, there is the risk of spontaneous pneumothorax, particularly in cysts of alveolar origin; progression of the condition to the stage at which the patient becomes a respiratory cripple is a not infrequent result in these cases. Bronchogenic cysts, as was noted above, often become infected.

A further hazard in bronchogenic cysts is the possibility mentioned by Moersch and Clagett (1947) and by Everts Graham (1947) that a carcinoma may originate in the cyst wall.

The advances in surgery of the chest during the past decade have made possible radical cure in many cases of cystic disease. In general cysts of the lung should be removed when this is technically possible and no contraindication exists. Simple removal of a cyst can sometimes be effected. Segmental resection, lobectomy or pneumonectomy may be necessary. It should be the aim to remove all cyst-bearing lung; otherwise a small cyst left behind may enlarge and ultimately negate the good immediate result of operation.

The following case illustrates the excellent result which follows the successful removal of a bronchogenic cyst:

The patient, a girl, aged eighteen years, had never been robust and had always been affected by lack of energy; this was becoming more pronounced. At the age of nine years she had been diagnosed as suffering from a spontaneous pneumothorax. She was found to have a large cyst occupying the greater part of the lower half of the thorax on the left side; the heart was displaced to the right. Removal of the cyst was advised and was later carried out by Mr. M. P. Susman. Bronchial elements in the cyst wall indicated that the cyst was of bronchial origin. Three months later she had increased in weight, she had much more energy and altogether felt very much better than before operation.

Large cysts are sometimes seen in young infants. These should be removed when diagnosed, and operation should not be deferred in the hope that the child will be better able to stand the operation later. Often, because of the size of the cyst and the pressure exerted on the opposite lung, the amount of functioning lung is incredibly small. A respiratory infection is likely to be fatal. If the child survives early hazards, feeding is usually difficult and retarded development is likely.

A small air-containing cyst may be watched for a time, particularly if it is known when the condition developed.

In one case, that of a girl of twenty-one years, an air cyst developed as a complication of a pulmonary abscess in an upper lobe. The abscess resolved rapidly, but the cyst steadily enlarged to a diameter of about three inches. At this stage, about five months after the cyst had first been noted, it was decided to have the patient submitted to operation. However, on her admission to hospital for this purpose, the cyst was found to be smaller; the reduction in size continued and it gradually disappeared.

Extensive disease of alveolar origin presents a problem in treatment. If it is confined to one lobe or to one lung, lobectomy or pneumonectomy can often be advised.

Occasionally in bilateral disease the disease may be confined to single lobes, and removal of the affected lobe in each lung can be undertaken. However, often all lobes are involved and no treatment is possible.

In some of these cases Head and Avery (1949) have employed suction drainage as employed by Monaldi in tuberculous cavities. The immediate results in the cases quoted appear to have been excellent; the later results would be awaited with interest. One wonders whether a small cyst or cysts not treated may later enlarge. This form of therapy may have a place in some cases in rendering a patient with an otherwise hopeless condition suitable for more definitive treatment.

Summary.

Basically lung cysts are bronchogenic or alveolar in origin. Both types may be congenital or acquired, and in both types vital and mechanical factors play a part in causation.

Disturbances of growth leading to local hypoplasia result in conditions mechanically favourable for the development of congenital cysts. Disturbances of growth may result from inherent defect of the *Anlage* cells, faulty local nutrition and other unknown factors of a vital character.

Cysts occur in the sequestrated lung segment—a somewhat rare developmental anomaly, which appears to result from mechanical interference with the growing bronchial tree by an abnormal blood vessel. Vascular anomalies may be a factor in causation of congenital cysts apart from the sequestrated lung segment. Acquired cysts result from partial blockage of a small bronchus in which a check-valve mechanism develops. The state of the bronchial walls cems to determine whether the resulting cyst is bronchial or alveolar in type.

Metabolic diseases, by interfering with the normal post-natal development of the lungs, may sometimes be a factor in the occurrence of all types of cyst.

Cysts in the lung lead to symptoms by reason of pressure, by becoming infected and by rupture leading to spontaneous pneumothorax. In bronchogenic cysts carcinoma may originate in the wall.

In an infant cystic disease may lead to retarded development.

Extensive cystic disease may cause the patient to be a respiratory cripple.

Occasionally lung cysts may be strongly indicated by the history and physical examination. However, X-ray examination is usually necessary to establish the diagnosis; in most cases the diagnosis can be made from the standard film.

Bronchography and tomography may be required, and the diagnosis in some cases can be made only after thoracotomy.

Because of the potential hazards, lung cysts should be removed if this is technically possible and no contraindication exists.

In extensive cystic disease of alveolar origin not considered suitable for operation, because of either the widespread nature of the condition or the poor general condition of the patient, suction drainage of the Monaldi type may sometimes be employed.

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THE USE OF PHARMACOLOGICAL RELAXANTS IN PSYCHIATRY.[1]

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ORGANIC curarizing substances are now widely used to modify or abolish the muscular component of artificially induced convulsions in the treatment of psychiatric patients. The object is to reduce the risk of injury.

Historical Review.

The history of the subject includes such names as Claude Bernard, Langley, Dale and Cannon.

In 1847 Claude Bernard localized the paralytic action of curare to some point between the motor nerve and the skeletal muscle. In 1909 Langley suggested that curare combined with receptor substances at the myo-neural junction, preventing nerve stimuli from acting on them.

In 1940, Bennett in America and Palmer in England modified leptazol and hexazole convulsions with curare, and in 1948 Webb used tubocurarine to modify electro-convulsive therapy.

Pharmacology.

The action of the drugs causing muscular relaxation is closely related to their chemical structure.

They have one feature in common: each is an organic compound including one or more quaternary ammonium groupings in its structure; acetylcholine is itself a quaternary ammonium compound, and many workers consider that the mode of action of *d*-tubocurarine is to block transmission at the neuro-muscular junction by opposing the depolarizing action of acetylcholine at the end-plate, possibly by "receptor competition". The effect of *d*-tubocurarine is reduced by physostigmine, which increases the concentration of acetylcholine at the neuro-muscular junction by preventing its hydrolysis by cholinesterase.

The effect of *d*-tubocurarine is to produce paralysis of skeletal muscles, the degree of paralysis depending on the size of the dose; the various muscle groups are not uniformly paralysed, the muscles of respiration being among the last to be affected. In man the duration of paralysis is approximately thirty to sixty minutes, and the side effects include blocking transmission through sympathetic ganglia and the release of histamine from skeletal muscles.

"Flaxedil" is a synthetic aromatic compound of lower molecular weight than *d*-tubocurarine. Its action lasts approximately twenty-five minutes and is opposed by physostigmine. It paralyses the limb muscles to a greater extent than the muscles of respiration, and has little ganglion-blocking effect and little histamine-releasing effect.

Decamethonium iodide (C10) is a synthetic aliphatic compound with a relatively simple structure. Its effect lasts fifteen to twenty minutes, and the only antidote is pentamethonium iodide in large doses.

Succinylcholine ("Scoline") is also a synthetic aliphatic compound, and has a still smaller molecule. This appears to be the most satisfactory compound in use; its action lasts for three or four minutes. Its mode of action is said to be direct depolarization of the end plate. Like C10 its initial effect is one of stimulation. Within thirty seconds after injection a generalized fascicular tremor of skeletal muscles is observed; this is followed by profound paralysis. After three or four minutes respiration returns, and the fascicular contractions are seen again, this time lasting over a minute.

It may be that succinylcholine imitates the action of acetylcholine, but is not destroyed so quickly. No antidote to succinylcholine is known apart from the physiological processes which overcome its effect.

Other synthetic compounds undergoing clinical trial include "Brevedil 'E'".

Clinical Details.

Succinylcholine is the drug most widely used at present, and two separate procedures may be employed. They are as follows.

In the first method, premedication is carried out one hour beforehand with atropine sulphate given hypodermically and a short-acting barbiturate given orally. Succinylcholine is then given intravenously. The lungs are inflated with oxygen by means of a bag and mask. Electroshock therapy is then given, and the lungs are inflated again at the conclusion of the seizure.

The second method is the one used in extramural practice in Melbourne. An anæsthetist is engaged and a small dose of thiopentone is administered intravenously and followed by succinylcholine injected from a separate syringe. Muscular relaxation is assumed to be adequate when fasciculation ceases. The patient's lungs are inflated with oxygen before and after the convulsion.

Dr. R. H. Orton disapproves of convulsive therapy without preliminary inflation of the patient's lungs with oxygen.

Dr. G. Egerton Williams maintains that succinylcholine and thiopentone may be mixed in the same syringe, provided that this is done immediately before injection and that there is an excess of thiopentone.

Dr. V. T. Stephen expresses disapproval of the use of relaxants while the patient is still conscious—a feeling which is supported by the subjective account of Dr. Prescott, who had *d*-tubocurarine administered to himself and was terrified when he had no means of indicating that a plug of mucus in his larynx was choking him. This is countered by the claim that the brief interval between paralysis and unconsciousness is covered by retrograde amnesia where electroconvulsive therapy is concerned.

At Ballarat Mental Hospital both the methods described have been used, but no definite conclusion has been reached.

Conclusion.

It is generally agreed that the therapeutic effect of this treatment is similar to that of convulsive therapy without relaxants; it is considered to be safe, involving less total risk to the patient than convulsive therapy alone.

The subject is summed up by the statement that when a patient becomes depressed he is "dried out" and put to sleep; he is then paralysed, shocked, and caused to have convulsions.

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Reports of Cases.

MULTIPLE DIVERTICULOSIS OF THE JEJUNUM AND ILEUM.

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MULTIPLE DIVERTICULOSIS of the jejunum and ileum is a supposedly acquired condition, in which there are numerous diverticula projecting from the bowel wall. In some instances, one or two non-Meckelian diverticula only may arise from the small bowel, but this type of case is not considered here.

In the past two years I have dealt with seven examples of multiple small bowel diverticulosis at operation, and these are the subject of this article.

Incidence.

It is obvious that the only true figures of incidence of multiple diverticulosis of the jejunum and ileum are those found in a series of unselected autopsies by the careful pathologist. Such a pathologist sees these conditions relatively frequently. King (1950), of Melbourne, for instance, found them in 0·6% of autopsies in a general hospital in which the average age at death of the subjects was fifty-five to sixty years. Even this figure may be low, because after death the diverticula, especially those in the ileum, collapse and may escape recognition unless the bowel is distended with air after the manner of Mahorner and Kisner (1947) during a search for evasive duodenal diverticula (Rosedale and Lawrence, 1936; River and Silverstein, 1951).

The surgeon's figures are not so accurate, as he sees this condition much less often because it is usually asymptomatic until complications (such as inflammation or perforation) occur, and this happened only 12 times in the 187 cases collected by Gerster (1938).

The radiologist's figures concerning jejunal and ileal diverticula in contradistinction to those of the duodenum are even less accurate. Using pooled statistics, Hellemand *et alii* (1951) stated that multiple small bowel diverticula were found in only 33 of 24,907 gastro-intestinal radiographs—that is, one-fourth of the autopsy incidence. This is due to the technical difficulties of fluoroscopic examination of the small bowel, so that many diverticula are missed, especially those of the ileum. Gold and Sawyer (1952) found that jejunal diverticula were the least common of all bowel diverticula. Alimentary diverticula were found in 221 of 4900 patients fluoroscopically examined—139 in the large bowel, 64 in the duodenum, 15 in the œsophagus, one gastric, one Meckelian, one in the jejunum and none in the ileum. The great fallacy of the radiologist's figures is that his series are always concerned with a small selected group of patients—namely, those with symptoms referable to the abdomen—so that it is necessary for them to be examined fluoroscopically by means of a barium meal and "follow-through".

Pathology.

In this condition there are numerous diverticula protruding from the small bowel, most commonly from the jejunum. However, they may also occur along the whole length of the small bowel or the ileum alone. In Orr and Russell's (1951) series of nine cases of multiple diverticula, seven were confined to the jejunum; in the other two the whole small bowel was affected. The relative incidence of the positions of the multiple diverticula in the small bowel in the two large series from the Mayo Clinic (Benson, Dixon and Waugh, 1943; Baskin and Mayo, 1952) cannot be determined from the data given, because many cases were of single diverticula only. Also, many diagnoses were radiological diagnoses, so that some diverticula, especially in the ileum, may have been missed. As all cases are massed together by the authors, the figures for those cases of multiple diverticulosis discovered at operation or autopsy cannot be abstracted.

In the small series of multiple diverticula here discussed, in four (Cases I, V, VI and VII) the jejunum alone was involved, whereas in the other three (Cases II, III and IV) both jejunum and ileum were involved. In each case the number of diverticula were so numerous as to be uncountable. They were so crowded together that there were no diverticula-free areas between them.

These diverticula are variable in size, the largest being found in the jejunum, the smallest in the ileum. The size of an individual diverticulum also varies according to the tension in the bowel lumen because they are so wide-necked; for instance, in Case IV a total small bowel obstruction caused enormous distension of all diverticula above the obstruction.

The diverticula usually project from the mesenteric border of the bowel, (*a*) between the layers of the mesentery or (*b*) from its right side when the proximal part of the jejunum is involved or (*c*) from either side when it is situated more distally (King, 1950). However, in Cases III and IV the diverticula occurred on the whole circumference of the bowel wall.

Many diverticula are associated with diverticulosis of other parts of the alimentary canal, especially the colon, as in Case IV.

Neither pathology nor ætiology will be discussed further, as this has been done by King (1950).

Age Incidence and Sex Distribution.

The age of discovery of these diverticula, either by symptoms due to the diverticula *per se* or by their complications, is high. In this series, the ages varied from fifty-five to seventy-nine years. Six diverticula occurred in males and one in a female (Case VII).

Clinical Features.

Although Willis (1950) states that these diverticula are of little clinical importance, nevertheless on reviewing a series of these cases, one fully agrees with Orr and Russell (1951) that this condition constitutes a definite clinical entity. These authors divided these cases into three clinical groups: (*a*) Those in which there are no symptoms, and in which diverticula are found when the abdomen is being explored for other lesions (Cases I to IV). In this group one also includes those cases found incidentally on radiological examination when one is looking for other lesions. There were none such in this series. (*b*) Those cases in which uncomplicated diverticula are present, and the patient has mild abdominal symptoms (Ritvo and Votta,

1946). These symptoms are probably due to distension of the bowel containing the diverticula rather than to the diverticula themselves (King, 1950) (Case V). (c) Those cases in which there is an acute abdominal catastrophe due to a complication affecting one or more of the diverticula. Many complications may occur, including perforation, infection, hæmorrhage, blockage of a diverticular neck and lumen by concretions, volvulus and intestinal obstruction (Aird, 1949; Aird also supplies a full list of references pertaining to these complications). The patient in Case VI had concretions in three jejunal diverticula. The resultant diverticulitis caused small bowel obstruction by fibrinous adhesions. In Case VII, one of the jejunal diverticula was perforated by a stick of wood, which caused general peritonitis.

Case Histories.

A. Diverticula Causing No Symptoms.

In Cases I and II the patients were males, aged sixty-five and sixty years respectively, and the diverticula were discovered incidentally when cholecystectomy was being performed for gall-stones. In Case I the jejunum alone was involved, whilst in Case II both jejunum and ileum were affected. In each instance the diverticula were situated along the mesenteric border. Neither patient had symptoms attributable to this condition either before or after operation, the patient in Case I being followed up for two years and the patient in Case II for eighteen months after operation.

In Case III a male patient, aged sixty years, had a carcinoma of the stomach which at operation was found to be inoperable. It was noticed that there were innumerable previously unsuspected diverticula scattered all over the surface of the whole of the small bowel. Those in the jejunum were large, whereas those in the ileum were small. These diverticula had never caused symptoms before operation, nor did they do so up to the time of the patient's death six months later. It was remarked at the time how difficult, if not impossible, the anastomosis between the stomach and jejunum would have been had gastrectomy been possible. A pre-operative radiographic examination by means of a barium meal had revealed the carcinoma, but a follow-through examination failed to reveal any bowel diverticula.

In Case IV the patient, a male, aged seventy-nine years, was interesting in many ways. He suffered from arteriosclerosis with hypertension, having an average systolic blood pressure of 250 millimetres of mercury and a diastolic pressure of 120 millimetres. After a severe bout of coughing during an attack of acute bronchitis, he developed a sudden severe continuous pain over the right side of the abdomen. This lasted six hours and was succeeded by generalized colicky abdominal pains, at first infrequent and mild, but becoming severe and frequent twenty-four hours later. This illness continued for four days with absolute constipation for wind and fæces. During this time, strange to say, there was never any vomiting. When he was first examined on the fourth day of his illness, he was found to have extreme generalized abdominal distension with tenderness over the right hypochondriac area. His general condition was remarkably good, probably because he had never vomited.

A diagnosis of large bowel obstruction was made, and as there were no localizing signs, a barium enema was administered. Radiographic examination then revealed an undistended large bowel, normal save for multiple diverticula of the sigmoid colon. The enema stopped at the caecum. Grossly dilated loops of small bowel were seen with no evidence of diverticula. (In view of the subsequent findings, one would have thought that at least a few gas-filled diverticula would be seen.)

Immediate operation then revealed that the original pain was the result of a large hæmorrhage into the gastro-colic omentum, due to rupture of a blood vessel by coughing. The subsequent inflammation caused the terminal portion of the ileum to become adherent to it by fibrinous adhesions. This became twisted and caused a complete obstruction of the terminal part of the ileum. There was enormous distension of all the small bowel except the last few inches of the terminal portion of the ileum below the obstruction. This was most fascinating to see, because the whole small bowel gave origin to numerous huge diverticula on all its aspects, so that it looked as if it was festooned with balloons so tense that one was loath to handle them for fear of rupturing them. There were a few small flaccid diverticula below the obstruction, which acted as a contrast to those above. By careful mobilization of the terminal part of the ileum away from the hæmorrhagic area, the obstruction was overcome. Convalescence was uneventful.

These diverticula had caused no symptoms previously, nor had they when he was followed up one year after operation.

In this illness these diverticula acted as safety valves, relieving the tension in the obstructed bowel so that he did not vomit. That is why his condition was so good after four days' complete small bowel obstruction, and why it mimicked a large bowel obstruction.

B. Diverticula Causing Mild Symptoms.

The patient in Case V was a male, aged fifty-five years. He had a ten years' history of irregular attacks of vague aching abdominal pain commencing in the epigastrium, one or two hours after meals. By an hour later, this pain would be spreading gradually into the left hypochondrium and down to the left lumbar and iliac regions. This pain was not relieved by food or alkaline mixtures. It was accompanied by flatulence, which occasionally relieved it.

Clinical examination and a complete "diagnostic work-up", including examination by means of a barium meal and follow-through and a barium enema, a cholecystogram and an excretion pyelogram, revealed no abnormality.

After many months' observation, an exploratory laparotomy was performed. This revealed that all abdominal organs were normal except the jejunum, from whose mesenteric border projected numerous diverticula. There were many large ones, and all had wide mouths. None contained concretions and there was no evidence of complication, so that no special diverticulum or group of diverticula could be blamed for the symptoms. As the symptoms were after all fairly mild, one felt that a large resection of bowel was completely unjustifiable, so the abdomen was closed.

When he was examined one year later the patient still had his symptoms, but he was a much happier man knowing their cause.

C. Diverticula with Complications.

The patient in Case VI was a male, aged sixty-seven years. He had been well until two weeks prior to his admission to hospital, when he noticed vague and irregular colicky pains in the left hypochondriac area. On the day of his admission to hospital this pain became continuous and severe and radiated to the left iliac fossa. It was associated with frequent and copious vomiting, which did not relieve it. He had passed neither wind nor fæces during the previous forty-eight hours.

Examination showed the patient to be a sick man with a furred tongue, a temperature of 100° F. and a pulse rate of 110 per minute; the respirations numbered 20 per minute. Upper abdominal distension was present. Generalized abdominal tenderness and rigidity were present most pronounced all over the left side of the abdomen especially in the left hypochondriac area. The abdomen was "silent", no bowel sounds being audible. Examination of all other systems, including a rectal examination and examination of the urine, gave normal results. A plain X-ray film disclosed some distended loops of small bowel in the upper part of the abdomen. There were no fluid levels and no evidence of diverticula, even when a close scrutiny was made after the operation.

At operation, multiple large wide-mouthed diverticula were found projecting from the mesenteric border of the jejunum. One of the diverticula on the first jejunal loop was packed with multiple facetted concretions which looked like gall-stones shining through the thin diverticular wall. However, they were soft and easily crushed. Extruding into the lumen of the second jejunal loop was another similar mass of concretions half out of a diverticulum.

There was also a similar mass of concretions in the lumen of the normal transverse colon. This mass had obviously come from yet another diverticulum and was passing through the bowel without causing trouble.

The whole of the first two jejunal loops were the seat of intense inflammation due to peridiverticulitis, so that they were red, engorged and covered with fibrin. They and the next two feet of jejunum were tremendously dilated, as were their diverticula, owing to a complete obstruction caused by a more distal loop of bowel being adherent to the inflamed loops and becoming kinked and twisted. The bowel distal to this was collapsed. When these plastic adhesions were divided, the obstruction was overcome. The masses of concretions were broken up by digital pressure and pushed into the bowel lumen. Owing to the widespread nature of the inflammation, to the bowel obstruction and to the fact that the diverticula were wide-mouthed, no resection was performed and the abdomen was closed without drainage. It was decided that if resection was necessary it would be best performed later when the effects of the inflammation and obstruction had subsided. However, convalescence was uneventful and the patient was discharged from hospital in fourteen days.

A follow-up examination twelve months later revealed no further abdominal symptoms referable to the diverticula.

The patient in Case VII was a female, aged seventy-nine years. This patient had always enjoyed good health until two days prior to her admission to hospital, when she suffered sudden severe pain in the epigastrium, which quickly radiated to the left side of the abdomen, settling down in the left iliac fossa. Twenty-four hours later the pain radiated all over the abdomen and was constantly present. The patient was constipated during this time, but there was no vomiting.

Examination disclosed the patient to be ill, with a dry, furred tongue. Her temperature was 100° F., her pulse rate was 100 per minute and her respirations numbered 25 per minute. The blood pressure was 130 millimetres of mercury, systolic, and 80 millimetres, diastolic. The abdomen was slightly distended and did not move on respiration. Generalized abdominal tenderness and rigidity were present, most pronounced on the left side. The abdomen was "silent". Rectal and pelvic examinations disclosed tenderness in the pouch of Douglas. All other systems were normal, as was the urine. A plain X-ray film of the abdomen revealed generalized distension of the bowel, both large and small. There was no evidence of diverticula of the bowel.

After fluid and electrolyte balance had been restored by intravenous therapy and alimentary suction instituted, laparotomy was performed through a left paramedian paraumbilical incision. General peritonitis was found with much free purulent fluid, which later yielded *Bacterium coli* on culture. On the mesenteric border of the jejunum were projecting numerous large diverticula. Through one of these, situated in the upper part of the jejunum, half protruded a piece of wood not unlike a toothpick. This was surrounded by an abscess which had ruptured into the general peritoneal cavity. The wood was removed and the resultant hole in the diverticulum was invaginated with a purse-string suture of chromicized catgut. Resection was not performed, either of the diverticulum or of the segment of the bowel from which it arose, because of the intense activity of the inflammatory process. The abdomen was closed without drainage. Convalescence, aided by the antibiotics penicillin and aureomycin, was uneventful, and the patient was discharged home on the sixteenth post-operative day. When examined again eighteen months later she had had no recurrence of bowel symptoms.

Discussion.

Diagnosis.

Whilst one deprecates the use of X-ray figures alone in forming an idea of the incidence of this condition, because the radiologist can overlook it even in very careful "follow-throughs", nevertheless positive radiological diagnosis is the only certain pre-operative one (Gold and Sawyer, 1952; Meuwissen and Oldenziel, 1952). However, sometimes one may suspect clinically the presence of diverticula of the small bowel, especially of the jejunum. When symptoms arise from jejunal diverticula, they cause epigastric pain which radiates to the left side of the abdomen, first to the left hypochondrium area and later to the left lumbar and iliac regions (Cases V, VI and VII; Edwards, 1939). When symptoms arise from ileal diverticula, the pain commences lower down in the mid-line, even down to the hypogastrium, and radiates to the right side of the lower part of the abdomen. In the former the tenderness and rigidity, if any, are found on the left side of the abdomen high up, whereas in the latter these signs are found on the right side low down.

Radiographic examinations were made in five cases, but in only two were follow-through barium meal examinations performed (Cases III and V). In Case IV a barium enema examination only was carried out, together with a plain X-ray examination of the small bowel. This showed no gas in the diverticula, although one would have expected to find gas in such a gross intestinal obstruction. In Cases VI and VII a plain radiograph only of the abdomen was performed. In no case were diverticula found or even suspected pre-operatively. Consequently, as Walker (1945) points out, a negative X-ray finding in this condition means little. On the other hand, in the recent Mayo Clinic series (Baskin and Mayo, 1952), 58 of 87 cases of jejunal diverticulosis were diagnosed radiologically.

Treatment.

Treatment in the asymptomatic cases of Group A is unnecessary.

In the cases in which mild symptoms are present (Group B), operative treatment is again unnecessary. There are so many diverticula that one cannot be sure which are causing the symptoms, which after all are very mild.

In Group C treatment is directed towards the complications, so that it will vary accordingly. In the presence of widespread inflammation, as in Cases VI and VII, it is obvious that the less one has to do the better it is for the patient. Breaking up the concretions with separation of the adhesions in Case VI, and removal of the piece of wood with suture of the perforation in Case VII, was all that was required. Resection of diverticula was unnecessary, and indeed would have been hazardous because of the widespread inflammation. There was even less need for bowel resection, which would have been even more hazardous.

In these cases of multiple diverticulosis it is doubtful if resection of individual diverticula is ever necessary. Resection of bowel segments may only very occasionally be necessary—as, for instance, when the condition is complicated by hæmorrhage or volvulus. This operation may be very dangerous, because the diverticula may be so crowded as to make anastomosis technically very difficult.

Summary.

Seven cases of multiple diverticulosis of the jejunum and ileum are discussed. All were unsuspected prior to operation. Four were found incidentally at operation for other conditions, one patient had mild symptoms, and two patients sustained complications, one from concretions causing peridiverticulitis and one from perforation by a piece of wood causing general peritonitis.

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Reviews.

The 1952 Year Book of General Surgery (June, 1951-May, 1952). Edited by Evarts A. Graham, A.B., M.D., with a section on Anæsthesia, edited by Stuart C. Cullen, M.D.; 1952. Chicago: The Year Book Publishers. 8" x 5¼", pp. 670, with 203 illustrations. Price: $6.00.

AMONG the virtues of this particular Year Book are the wide range of literature covered, the extended length of selected abstracts and the free use of illustrations. The wide cover brings to the surgeon, even the well-read surgeon, important material that he would otherwise be unlikely to meet. An example of an extended abstract is that of an article on milliequivalent as the unit of measure in calculating electrolyte deficiencies in body fluids, which comes from an American journal of limited circulation. The free use of illustrations is, of course, essential in a book on surgical subjects, especially when surgical technique is described, but it is particularly helpful when the text is necessarily reduced to a minimum. The section on surgery, which is edited by Evarts A. Graham and takes up most of the book, has chapters on general topics, armamentarium, shock, water and electrolytes, nutrition, chemotherapy and biologicals, wounds, wound infection and burns, neoplasms, sympathectomy, hernia and the various individual anatomical regions or systems. The section on anæsthesia, which is edited by Stuart C. Cullen and takes up about 90 pages, is notable for the high proportion of articles taken from sources other than the anæsthetists' own specialized journals. It has chapters on premedication, inhalation anæsthesia, ventilation, barbiturates, muscle relaxants, spinal anæsthesia, local anæsthetics, circulation and miscellaneous topics. The Year Book covers journals received by the editors between June, 1951, and May, 1952, and as a sound aid to keeping up to date will be welcomed by surgeons, anæsthetists and all others who have any interest in surgery or anæsthesia.

Poliomyelitis. By W. Ritchie Russell, C.B.E., M.D. (Edin.), M.A. (Oxon.), F.R.C.P. (Edin.), F.R.C.P. (London); 1952. London: Edward Arnold and Company. 9" x 5¾", pp. 90, with 20 illustrations. Price: 14s.

IN the preface Russell states that he is very much aware that in certain aspects his comments must appear amateurish. This modesty does not extend to the text. The language is forceful and may lead to confusion between the author's ideas and proven facts. It is disappointing that a book published in 1952 does not give to a doctor, anxious to help his patient, the guidance given by Charles Fayette Taylor in "Infantile Paralysis and its Attendant Deformities" published in 1867.

The chapters dealing with examination of patients in the early stages, and with the effect of physical activity during the initial illness on the degree and localization of the subsequent paralysis, suggest that in this phase Russell has had some experience.

Differential diagnosis is discussed very briefly, as are the more recent advances in knowledge: (*a*) the association of trauma and parenteral injections with limbs subsequently paralysed; (*b*) the influence of tonsillectomy in increasing the risks that subsequent poliomyelitis will be of the bulbar type.

It is questionable whether anyone of amateur status should give advice on medical emergencies such as bulbar poliomyelitis or the care of patients in respirators. Russell states: "The skilled use of postural drainage makes the operation of tracheotomy rarely necessary." Many patients will not stand the degree of posturing advised by Russell. A patient pooling mucus is in constant danger of sudden asphyxia. No detailed advice on the use of mechanical suction is given. Measures to combat dehydration are not mentioned. Russell considers hyperventilation is a danger to a patient in a respirator. McLorinan and Colville, of Melbourne, consider that while a patient is febrile the risk of under-ventilation anoxia is high.

The chapters "Care of Muscles and Joints and Rehabilitation" read as though an attempt is being made to justify, by theories, a policy of emptying hospital beds rapidly and evasion of responsibility of steering paralysed people past deformity to the maximum physical recovery.

Textbook of Public Health (Formerly Hope and Stallybrass). By W. M. Frazer, O.B.E., M.D., Ch.B., M.Sc., D.P.H.; Thirteenth Edition; 1953. Edinburgh and London: E. and S. Livingstone, Limited. 9" x 6", pp. 674, with 76 illustrations. Price: 42s.

FOR many years the text-book "Hope and Stallybrass", later "Frazer and Stallybrass", has been well known to those interested in public health and social medicine. Owing to the death of Dr. Stallybrass early in 1951, the responsibility for the preparation of this edition, the thirteenth, has been assumed solely by Professor Frazer.

As in the previous edition, most changes are seen in the chapters dealing with law and administration. Since the twelfth edition appeared in 1948, much experience has been gained in the detailed working of the National Health Service. A new chapter has been added to deal with this service and with the effect of the *National Health Service Act*, 1946, upon other services. The author's observation that "the National Health Service was not intended to function in isolation, but as an integral part of a vast body of legislation which makes provision for the sick, the aged, the unemployed, the widow and the orphan, the blind, the deaf and dumb, and in short, all those who, in a complicated modern society, require help from the State for one reason or another" sums up his attitude to this legislation.

In a book which covers such a large field, it is natural that the chapter on infectious diseases cannot be complete. Perhaps the space given to each disease could be better balanced; for example, poliomyelitis is given only about one-fifth of the space allotted to scarlet fever. There is no mention of the possible relationship between injections and poliomyelitis. However, the other chapters are particularly well done, and the high standard set by previous editions is maintained. Even though the health laws dealt with are British, over the last century health legislation in Britain has formed the pattern for health legislation in this country.

For medical practitioners, particularly medical officers of health, and for medical students, it will form an excellent reference book in public health and social medicine. For graduates studying for the Diploma of Public Health it is an admirable text-book. The subject matter is well indexed, headings are well chosen, and the book is easy to read.

Clinical Investigation: A Manual for Practitioners and Students. By E. H. Stokes, M.D., Ch.M. (Sydney), F.R.A.C.P., with a foreword by G. E. Beaumont, M.A., D.M., F.R.C.P., D.P.H.; 1953. Sydney: Angus and Robertson. 9" x 6", pp. 640, with 344 illustrations, some in colour. Price: £5 5s.

IN writing and presenting "Clinical Investigation: A Manual for Practitioners and Students" Dr. E. H. Stokes has entered a difficult but most important field in undergraduate training. At the same time he has provided a manual of great value to the busy practitioner seeking to refresh his memory or obtain concise information in investigations relevant to patients under his care.

The general arrangement of the work is similar to that found in other manuals dealing with signs and symptoms and their interpretation; but it is evident that Dr. Stokes has imparted something of himself, and by illustration, pictorial and with case-records, has sought to increase the interest in a factual and necessarily somewhat dogmatic book.

History-taking or case-recording is discussed in broad outline and then separate chapters deal with general appearance and with the various systems of the body in detail—circulatory, respiratory, alimentary, genito-urinary, nervous and hæmatopoietic.

Each system is discussed from the viewpoint of the clinician interviewing and examining a patient suffering from an affection of that system; thus are coordinated history, physical examination, the interpretation of physical signs, the ancillary methods of examination such as radiography, electrocardiography, biochemical tests, tests of functional efficiency and the like. Necessarily in using this method a certain amount of duplication occurs, but very skilfully this has been reduced to an unobtrusive minimum. Not only does each chapter provide a concise, accurate and interesting outline for the student approaching clinical medicine for the first time, but it also contains brief descriptions of the investigations of proven or probable value such as fractional test meals, blood urea clearance and other tests of renal function, tests of hepatic function, examination of the peripheral blood, the cerebro-spinal fluid and the like.

Errors and pitfalls in diagnosis are given with such clarity that every student and practitioner would do well to ask himself how frequently he had experienced the same or similar troubles and to revise his own standards.

The appendices provide, firstly, very useful notes on the normal values of some blood constituents and the significance of changes in the values, and, secondly, an excellent summary of the main points of each chapter. These summaries could with advantage be added at the end of each chapter because of their obvious value to the beginner.

Inevitably there are minor criticisms, among which attention may be directed to apparent stress on pain in gastric carcinoma, the inaccurate explanation of the radiation of pain in cholecystitis, and the suggestion that biliary colic necessarily means that stones pass along the ducts. Some physicians prefer to examine the patient with the sigmoidoscope before making an X-ray examination of the colon.

This book is a welcome addition to the library and students will doubtless prefer it to many others; but we should like more of the black and white illustrations to be up to the very high quality of the text; some of the pictures are woefully inadequate. It can be strongly recommended especially to medical students commencing their clinical work.

History of the Royal Medical Society, 1737-1937. By James Gray, M.A., F.R.S.E., edited by Douglas Guthrie, M.D., F.R.C.S.E., with a foreword by Robert Hutchison, Bart., M.D., LL.D., F.R.C.P.; 1952. Edinburgh: The University Press. 10″ × 6¾″, pp. 366, with seven illustrations. Price: 42s.

THE late Mr. James Gray rendered a distinguished service to the medical profession when he undertook a thorough investigation of the personalities and events connected with the Royal Medical Society of Edinburgh throughout its unbroken record of usefulness and cultural inspiration from the foundation in 1737 down to the present day. Mr. Gray's interest in this most ancient medical society in Great Britain was a family one; his first introduction to its history came about while he was seeking information from the minute books to provide material for an article on the industrial development of a business firm with which he and his grandfather had been closely associated. And those who care to read this substantial volume from cover to cover surely will agree with its editor, Dr. Douglas Guthrie, that Gray approached his task in the true historical spirit and worked with enthusiasm in his efforts to trace the growth of medical knowledge in so far as it helped to influence the changing fortunes of the society through the last two centuries.

The narrative opens with the patriotic gesture of John and Alexander Monro in founding a medical school in Edinburgh on lines similar to those they had observed at the famous Leyden school, then flourishing under the enlightened teaching of Hermann Boerhaave early in the eighteenth century. Under the guiding influence and dynamic energy of Professor Alexander Monro, *primus*, the faculty of medicine within the University of Edinburgh was established in 1726; and, eight years later, six students of medicine, "fired by the example of their masters, who had nothing more at heart than the improvement of those who committed themselves to their tuition", met periodically to discuss medical papers contributed by themselves. These informal gatherings under the watchful eye of the Professor of Anatomy led to the formation of the Medical Society in 1737, and later to its incorporation by Royal Charter.

The main substance of the text consists of a categorical account of persons who were prominent in serving the society throughout its long existence, with the addition of biographical sketches in many suitable instances; while frequent references are made to unromantic transactions commonly and inevitably associated with the routine business of any similarly constituted body. However, this compendious volume is sure to be warmly appreciated by those practitioners who have had any personal or professional relations with Scottish medicine; and to these readers it will not seem at all remarkable that so many famous names in the medical past were connected in some way with the Edinburgh school and its well-disciplined nursery, the Royal Medical Society.

Mr. Gray brings his history to an end with this short paragraph:

> The Society is primarily, but not purely, a student society. There is the senior element, never intrusive, but careful to ensure adherence to sound traditions. With the maintenance of these traditions, the Royal Medical Society will continue to flourish.

The book is handsomely produced and tastefully illustrated, while Sir Robert Hutchison, whose name appears in the long list of past presidents of the society, has written a foreword giving it his warm commendation. Let us hope that our own medical societies will gain confidence and renewed inspiration from the achievements of our brethren in Scotland.

Ciba Foundation Colloquia on Endocrinology. Volume IV: Anterior Pituitary Secretion and Hormonal Influences in Water Metabolism. Edited by G. E. W. Wolstenholme, O.B.E., M.A., M.B., B.Ch., assisted by Margaret P. Cameron, M.A., A.B.L.S.; 1952. London: J. and A. Churchill, Limited. 8″ × 5¼″, pp. 614, with 139 illustrations. Price: 45s.

THE first three volumes of the "Ciba Foundation Colloquia on Endocrinology" have been reviewed recently in this journal. Volume IV consists of two parts; Book I is a record of a short conference on aspects of anterior pituitary function and Book II deals with the effects of hormones on water metabolism.

Book I is divided into seven parts: Part I—anatomy, histology and cytology with six papers each with discussion; Part II—control of secretions of the anterior pituitary lobe with sixteen papers and discussions; Part III—growth hormones, one paper with discussion; Part IV—gonadotrophins—three papers with discussions; Part V—thyrotrophic hormone, three papers with discussions; Part VI—adrenocorticotrophic hormone with five papers and discussions; Part VII—lactogenic and mammogenic hormones, three papers with discussions.

Book II contains fifteen papers with the chairman's opening and closing remarks and discussions.

In both series the range covered is very large and the speakers are the leading workers in the particular aspects of endocrinology treated from Europe and America. It is therefore impossible to attempt to give any account of the work covered, but the individual papers are all of high standard. This is not a book for general reading, but the specialist in endocrinology could gain much valuable information from it.

Fanconi and Wallgren's Textbook of Pædiatrics. Edited by W. R. F. Collis, M.A., M.D., F.R.C.P., F.R.C.P.I., D.P.H., translator and co-editor, E. Kawerau, M.B., M.Sc., A.R.I.C.; 1952. London: William Heinemann (Medical Books), Limited. 10″ × 6¾″, pp. 1124, with 441 illustrations, some in colour. Price: £7 7s.

"FANCONI AND WALLGREN'S TEXTBOOK OF PÆDIATRICS" is a European text-book of high quality written by an international team of expert pædiatricians of outstanding qualification. After the turmoil of the recent world war and the deplorable social disturbance and economic distress caused thereby in Europe, it is opportune that this great compendium of pædiatric lore should be prepared to assist in the reconstruction of a healthy child population by placing on record the manifold causes of ill-health with particular emphasis on the European aspects of the subject. The text-book has appeared in the German language, but Dr. W. R. F. Collis, of Dublin, has edited the English edition which is in our hands. Great credit must be given to Dr. E. Kawerau, who has assisted Dr. Collis and is responsible for the translation into elegant idiomatic English which is barely distinguishable from an original English production.

Professor Fanconi has contributed chapters on the examination of sick children, the disorders of puberty and adolescence, allergic and kindred reactions, anomalies and diseases of the teeth, diseases of the kidneys and urogenital organs, organic disease of the nervous system, diseases of the skeletal system and a survey of surgical conditions in childhood. Professor Wallgren's personal participation is also impressive; the chapters ascribed to him are those on

tuberculosis, juvenile rheumatism and a synopsis of medical treatment. Professor Glanzmann, of Berne, has made a substantial and important contribution consisting of the chapters on constitution, heredity, diathesis, psychology of the normal and abnormal child, vitamins and vitamin deficiency states.

Thus far we have mentioned only fourteen out of thirty-three chapters and only three out of nineteen contributors. We failed to find any representation of France, Italy or Spain, but central European countries, Scandinavia and the Netherlands are prominent. Ireland is represented by Dr. Collis's chapter on diseases of the upper respiratory passages, ears and cervical lymph glands. Dr. Bodian, of London, has supplied an account of his important recent work on megacolon as a section in the description by Professor Svejcar of diseases of the gastro-intestinal tract. Another outstanding contribution is that of Professor Van Crefeld, of Amsterdam, on diseases of the liver. Professor Eckstein, who has written a book on malaria in childhood, has prepared for this text-book an unusual epitome of the diseases of childhood peculiar to hot climates.

As is inevitable when so large a field has to be covered within the confines of a single volume however noble, the separate items are compressed and are by no means exhaustive. There are many very good schemata, charts and photographs. The coloured illustrations on dermatological, hæmatological and exanthematous conditions are excellent. Instead of the usual bibliography, each author has supplied a short list of selected references for further reading. The text is punctuated throughout by facts brought out in bold, black type on first-class paper and the index is clear and comprehensive. The text-book is essentially a work of reference and a very valuable one. It should be made available to medical practitioners by inclusion in every public medical library.

The Surgery of Pancreatic Neoplasms. By Rodney Smith, M.S., F.R.C.S.; 1953. Edinburgh and London: E. S. Livingstone, Limited. 10" × 7", pp. 164, with 111 illustrations. Price: 35s.

THIS excellently produced monograph is the successful Jacksonian Prize Essay for 1952. Its academic standard is, therefore, high, and the subject matter authentic and critical.

All essays of this type reflect arduous preparation, impeccable presentation and a careful avoidance of dogma. In this fashion, a comprehensive and unbiased view of the subject is attained, not without disadvantages.

A brief description of the relevant anatomy (which omits Millbourn's work in the duct system) and physiology precedes a review of the history of pancreatic surgery. The classification, pathology and results of pancreatic neoplasms introduce the investigation of a suspected case. This section is of a high standard. Australian surgeons will enviously note the claim of the radiologists that 50% of pancreatic lesions are demonstrable.

The author emphasizes the poor prospects which accrue from allowing the disease to run its natural course (eight to ten months, even with palliative surgery). The assessment of the condition at laparotomy is, therefore, fully dealt with (including transduodenal biopsy) in order that a radical approach may be followed. The risks are well stated and the palliative and radical procedures described in detail. The work concludes with adequate reference to cystadenoma and its malignant counterpart, islet-celled tumours, sarcoma and benign tumours, and with an interesting appendix of illustrative cases and a well-compiled bibliography.

This essay is so full of merit that criticism is difficult and unreasonable. There is insufficient emphasis on the modern approach to cancer surgery—namely, that curability (not operability) is the best indication for major radical surgery. This is especially so when the post-operative state is not without distressing invalidism. Pancreatic replacement therapy is not always successful. If recurrence is added to this picture of physiological decrepitude, many surgeons would favour Garlock's faint-hearted (or common-sense) approach.

The radical procedure now favoured aims at an early decision on the relation of the growth to the portal vein, and, with this in view, early transection of the pancreas is undertaken. In this country, Charles Osborn's recommendations (pancreatic stump implantation into the jejunal end, with end-to-side anastomosis of the bile duct and stomach in a two-stage procedure) are often followed. They appear to have certain advantages over the radical method recommended.

But these are all puny criticisms in so admirable a book, which reflects the high tradition of its source.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Diseases of Children", edited by Alan Moncrieff, C.B.E., M.D., F.R.C.P., and Philip Evans, M.D., M.Sc., F.R.C.P.; Fifth Edition; 1953. London: Edward Arnold and Company. In two volumes. 9" × 6", pp. 1990, with 690 illustrations. Price: £7 the set.

There are 50 contributors.

"Emergency Surgery: Part V", by Hamilton Bailey, F.R.C.S. (England), F.A.C.S., F.I.C.S., F.R.S.E., assisted by Norman M. Matheson, M.B., Ch.B., M.R.C.P. (London), F.R.C.S. (England), F.A.C.S.; Sixth Edition; 1953. Bristol: John Wright and Sons, Limited. London: Simpkin Marshall, Limited. 10" × 7", pp. 216, with 241 illustrations. Price: 21s.

The first part of the sixth edition was published in 1948; this part, V, contains chapters 74 to 90 inclusive.

"An Unsolved Problem of Biology", by P. B. Medawar; 1952. London: H. K. Lewis and Company, Limited. 10" × 6½", pp. 24, with three text figures. Price: 5s.

An inaugural lecture delivered at University College, London, on December 6, 1951.

"Histochemistry: Theoretical and Applied", by A. G. Everson Pearse, M.A., M.D. (Cambridge), D.C.P. (London); 1953. London: J. and A. Churchill, Limited. 9½" × 6½", pp. 538, with 109 illustrations and four plates in colour. Price: 60s.

The book is an attempt "to compass the whole of histochemistry, as applied to tissue sections".

"Gynecological and Obstetrical Pathology", by Peter A. Herbut, M.D.; 1953. Philadelphia: Lea and Febiger. Sydney: Angus and Robertson, Limited. 9½" × 6½", pp. 684, with 428 illustrations and two plates in colour. Price: £6 14s. 3d.

The book is "intended for anyone interested in the pathology of the female generative system".

"Monographs in Medicine: Series I", edited by William B. Bean, M.D., with associate editors Morton Hamburger, M.D., John A. Leutscher, junior, M.D., and Stewart Wolf, M.D.; 1952. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" × 6½", pp. 664, with about 50 illustrations. Price: £6 9s.

The work of twenty contributors.

"Pain Sensations and Reactions", by James D. Hardy, Ph.D., Harold G. Wolff, M.D., and Helen Goodell, B.S., with a foreword by Edwin G. Boring, Ph.D.; 1952. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9½" × 6", pp. 450, with 130 text figures. Price: 70s.

The authors' aim is "to discuss the traditional concepts of pain, the newer data respecting the phenomenology of pain, and to outline a comprehensive theory of the pain experience compatible with available information".

"Fundamentals of Clinical Orthopedics", by Peter A. Casagrande, M.D., and Harold M. Frost, junior, M.D., with forewords by Joseph S. Barr, M.D., and Frank N. Potts, M.D.; 1953. New York: Grune and Stratton, Incorporated. 11" × 8½", pp. 592, with 390 illustrations. Price: $18.50.

"If physicians, residents, interns and medical students who find themselves obliged to manage orthopedic problems find this book of some use, it fulfills its purpose."

"Sympathetic Control of Human Blood Vessels", by H. Barcroft, M.A., M.D., M.R.C.P., and H. J. C. Swan, Ph.D., M.B., B.S., M.R.C.P.; 1953. London: Edward Arnold and Company. 9" × 6", pp. 172, with about 80 illustrations. Price: 18s.

The object is "to present the concept of the control of the blood vessels from the viewpoint of the investigator in this special field".

The Medical Journal of Australia

SATURDAY, MAY 23, 1953.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given without abbreviation: surname of author, initials of author, year, full title of article, name of journal without abbreviation, volume, number of first page of the article. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

THE WELL-BEING OF HOSPITAL IN-PATIENTS.

IN December, 1951, hospital practice from the point of view of the patient was discussed in these columns in an article entitled "The Patient is a Person". The discussion was based on an account given by a woman patient of her experiences in the surgical wards of a hospital, and a reference was also made to a contribution by L. H. Bartemeier, who had referred to the psychological aspect of the doctor-patient relationship. With the advent of the National Health Service, more attention than heretofore has recently been given to the way in which hospital patients are treated in Great Britain. In a recent publication by the Ministry of Health on behalf of the Central Health Services Council, the reception and welfare of in-patients in hospitals are discussed at some length. Australia has no medical service comparable with that of the National Health Service of Great Britain, but the well-being of patients in hospitals is, on that account, not a less important subject in Australia than it is in the Old Country. The Ministry of Health's brochure is a twenty-four-page document, and it is so full of useful and forceful argument that a somewhat detailed account of it should be presented to Australian practitioners.

This document opens with the statement, quite obvious but often forgotten, that hospital service is one of the very few organizations which have to care for those they serve for twenty-four hours in each day. Since the patient has "to live, move (if at all) and have his whole being" in the hospital, hospitals have a responsibility for patients as people in addition to the immediate responsibility of dealing with the bodily ailment which is the cause of the patient's illness. There is, we read, a natural and, to a large extent, a commendable tendency for hospitals to concentrate on the restoration of the patient's bodily or mental health and to see him back to normal life. Such an attitude fails to recognize that patients should not "cease to be people with personalities, needs, and interests of their own, and become merely bodies". Patients are identified, for example, as "the duodenal in the first bed on the left". To distinguish between hospitals which care for people and those which deal with cases is not a mere play with words: "It is to recognize a profound difference in the whole atmosphere of the two", which can be of great importance to the patient. These are statements which will be recognized as true by many readers of this journal, and some will no doubt think that too much emphasis is laid upon it. To this we would object. After our last discussion of the patient as a person, one reader of this journal, with perhaps commendable over-emphasis, said that the facts set out should be restated every month. To make confirmed jargon-addicts change their manner of speech is very difficult. The effort, however, is worth while if it leads in some instances to a revision of fundamental ideas.

With regard to the complexities of administration, the reader is reminded that the patient is affected by the actions of many people who in the past have found it no part of their function to consult his convenience. The patient, too, easily receives the impression that he has passed into the grip of a monstrous machine whose working he does not understand and cannot influence. It is probably true in Australia, as in Great Britain, that many hospitals are making conscious efforts to fill the gap in human relations caused by modern developments, and that in other hospitals, though individuals are alive to the need, there is no general sense of the hospital's responsibility. Good relations with patients cannot be regarded as a natural growth of a modern hospital. "They require cultivation, and will only be attained if everybody who comes into contact with the patient, from the consultant to the charwoman, regards it as part of his or her job to produce them." The compilers of the report recognize that financial considerations will make it difficult for some of their recommendations to be put into effect at once. What they ask is that first and foremost the problem shall be recognized. Deficiencies do not always exist because of lack of money, but because nobody has made it his business to consider whether there is a deficiency from the patient's point of view. Among the important sections of this report is one dealing with "information". It is thought that before his admission to hospital, the patient should be given some information about the hospital and its aims—its function and the part it plays and has played in the life of the community. If this is properly done, the patient may be persuaded that although he has temporarily forsaken his home and employment, he is being looked after not by an impersonal organization of officials, but by a group of people with a tradition of service behind them. The Central Health Services Council thinks that there is a widespread feeling among patients and their relatives that they do not receive enough information, either about the nature and probable course of their illness, or about its implications for their family and business affairs. This will be recognized to be a matter of some difficulty. It is better for some patients if they do not know the full implications of their illnesses, although we have always held that if an intelligent patient wishes to know the truth about his ailment, he should be told. In regard to other people, it is important that only those entitled to receive information should have it given to them. This is recognized by the Council, but the statement about it comes at the end of the section dealing with the subject and not at the beginning, as it should.

Reference is made to an American experiment in which all the resident medical staff and the almoners assemble once a week in a hall of the hospital, so that patients' relatives can consult them, and these meetings are said to have proved valuable to the staff as well as to the visitors. This will probably be regarded as an example of excessive zeal and as being unworkable on account of the amount of work which the staff normally has to undertake. We can, however, consent to the Council's statement that it is of the utmost importance and that it should become the accepted view that patients should have access to the medical staff and be able to ask about their illnesses. Each patient should be told whom he or she could consult. In regard to inquiries by telephone, it is suggested that inquirers should be able to speak to those who are actually looking after the patient. This presumably, in the ordinary course of events, would be the ward sister or nurse in charge. It is a little difficult to see how duties of this kind could normally be added to the great amount of work which these women already have to do.

In regard to reception arrangements, the Council is concerned with the desirability that the patient's feelings should be looked after as well as his body. Here we can recall the story in December, 1951, from *The Lancet*, of the woman who was examined in complete silence, receiving from the examining doctor no greeting, no smile, no sign that anyone was in the room but himself and the nurse. Incidents of this kind do happen in this country, and of those responsible for them we can only say that it would have been much better had they become motor mechanics or donkeymen, instead of busying themselves with an occupation supposedly concerned with the welfare of human beings. There is no doubt that efficiency is excellent, but it should always be tempered with sympathy and understanding. In regard to non-emergency admissions, it is stated that the patient on a waiting list should be given as much information as possible about how long he may expect to wait, and that he should be told exactly how he will be notified of a vacancy. We agree that lists should be reviewed regularly in order to avoid wasting time by calling in a patient who no longer needs a bed. Sometimes it is not the list but the patients who should be reviewed. Readers may recall an article by D. L. Dey, published in this journal in April, 1952, in which a survey was made of 681 children awaiting tonsillectomy. The author showed that after a waiting period of at least eighteen months, a review suggested that over one-third of the children no longer required operations. The same kind of finding could be reported in regard to other conditions in which delayed operations are often thought to be necessary. The Council attaches the greatest importance to the personality and suitability of the person who first receives the patient, and it is thought that whenever possible, hospitals should employ a receptionist especially for this purpose. Most people will agree with the statement that the time of patients' arrival should be chosen so that there will be as little delay as possible in dealing with them. The statement is also made that there is an even greater need at the present time for sympathetic people to control the system of admission to mental hospitals, and that the nursing staff in the admission wards should be those with a particular flair for inspiring confidence.

The only other section of this report to which reference will be made has to do with visiting hours. Visiting hours, we read, are not merely an interruption of hospital routine. They are a means by which the patient is kept in touch with the world which he knows and understands, and by which it is made easier for him to fit into this world on his return to it. Most people will agree that from the patient's point of view visiting hours are sometimes inadequate. It is thought that in large centres of population frequent visits of short duration seem to be quite practicable. On the other hand, it is stated that it would be advisable to have at least one fairly long visit each week to cater for those who have to come from long distances. Some few months ago, reference was made in these pages to the visits by parents to children in hospital, and to the daily visits which are permitted in some places, so that children may be kept in touch with their parents, especially the mother, and their recovery may be expedited. This question is admittedly controversial. It must be conceded that there are some children who cannot settle down and be fitted into the hospital routine unless they are separated from their parents. Whatever is done in the matter of visiting hours, it will always be necessary to preserve the smooth running of the work in hospital wards—in other words, the intrusion of visitors must not be prejudicial to the essential treatment of the sick patient.

It will be clear that there is in this report a great deal that serves to emphasize the importance of the patient as a person. This is the sort of document which should be studied by hospital boards. Unfortunately, if effect is to be given to many of the recommendations, much larger staffs will be needed than are at present available.

Current Comment.

MEASLES ENCEPHALITIS.

CHILDREN who have suffered from and recovered from encephalitis associated with an acute infectious disease often present behaviour problems that the medical adviser may find very difficult to deal with and the parents find practically intolerable. Referring to the disturbed behaviour of persons convalescent from acute encephalitis in general, Edith Meyer and R. K. Byers[1] point out that opinion in regard to its genesis has gradually changed; whereas formerly the behaviour complex was felt to result from the action of the disease on the cerebrum, it is now more generally considered that the observed behaviour is the result of the impact of environmental demands upon cerebral function qualitatively altered by disease. Between 1943 and 1949 sixteen children recovered from measles encephalitis at the Children's Hospital, Boston. Meyer and Byers have been able to follow up these children in greater or less detail and to study their neurological and psychological progress. Their study indicates that after apparent recovery abnormalities of mental functioning can be demonstrated in a very high proportion of cases when neurological and electroencephalographic evidences of the disease have disappeared. Easy fatigability of intellectual function, defects in attention, defects in perceptual-spatial organization and defects in learning capacity tend to persist for months, or even permanently, in about a third of the children. Patients whose disease ran a short acute course fared better in this regard than those whose disease had a prolonged course. Meyer and Byers point out that

[1] *Am. J. Dis. Child.*, November, 1952.

when the psychological defects persist, inability to acquire new knowledge and adaptations produces a relative intellectual deterioration over the years. Motor disabilities may add to the patient's difficulties, but they appear to be temporary as judged from this material. The child's inability to live up to the expectations of home, school and society produces emotional stress expressed as either retreat into himself or aggressive rebellion. A plan of life which makes the necessary concessions to his disability and allows the child ease during the period of waiting for the recovery process to take place may make the eventual resumption of his responsibilities easier. Among preschool children modifications of the mother's expectations in regard to dressing, eating, toilet habits and the like, need to be combined with direct emotional support, affection and patience. School children usually do better with a home teacher for months or even a year or more after an attack, or, if this is not possible, repetition of previous school grades on a modified schedule may work out. If it is evident that the child can carry his expected load after experimenting with smaller loads, he should be allowed to do so, but with some reluctance. It appears that the age of the patient at the time of the attack influences the outcome. Older children, because of their more elaborate foundation of learning, are more likely to remain competitive, in spite of incomplete intellectual recovery, than are younger children who must then acquire even the most fundamental learning with defective tools. Although it seems that a programme based on concession to observable psychopathology often may diminish anxiety and tension and tend to improve behaviour, there is no evidence from this study that the fundamental pathological changes in the brain can be influenced thereby. One point made by Meyer and Byers appears particularly important if these children are to be understood and helped. They state that recovery to the previously achieved level of competence occurs in a large proportion of cases in a matter of weeks or months, and this may mistakenly be considered complete. It is, in fact, not always complete. Complete recovery in childhood implies the ability to acquire new knowledge and new adaptations, and unless this capacity is fully restored, frustration and disappointment are likely to overbalance satisfaction in school, home and social contacts.

PHYSICAL MEDICINE AND OBESITY.

PEOPLE who wish to reduce weight seldom want for advice, which may or may not be offered in return for a stout fee. Many of them receive advice that is paid for and relates to some form of physical treatment. "Actually, the value of any type of physical treatment in reducing the weight of the person who is overweight is so slight that it can be said that physical medicine plays an extremely minor role in the correct therapeutic management of obesity." So writes Frank H. Krusen, chairman of the Council on Physical Medicine and Rehabilitation of the American Medical Association, in an article prepared at the request of the Council on Foods and Nutrition of the same association. He points out that in so far as the reduction of weight is concerned, physical agents are capable only of increasing the caloric output or the fluid output of the human body, and they are not capable of diminishing caloric input. Because an increased output of fluids must promptly be compensated for by an equal input of fluids, and because increasing the caloric output is extremely difficult and often dangerous, the limitations of physical medicine in reducing bodily weight immediately become apparent. The usual claims for reduction of weight ostensibly based on baths, massage and exercise, depend basically on a special low-calorie diet which is introduced somewhat surreptitiously in conjunction with the "highly touted physical procedures".

All that the endless variety of hot baths can produce is a transient loss in weight through the production of profuse perspiration. Over two pounds may be lost in an hour in this way, but there is no indication of any decrease in the amount of adipose tissue; the loss of weight is as transient as the dehydration which produces it. Krusen quotes an associate, Gordon Martin, who has pointed out that theoretically it would be necessary for a person to take 370 hot baths, in which, on each occasion, the bodily temperature was raised 2° F. in one hour, in order that he should lose one pound of adipose tissue. He adds that, according to certain experimental evidence, a slightly greater increase in the metabolic rate could result from the simple act of chewing gum, provided the gum was free of sugar and calories. Cold baths of any kind produce a feeling of well-being, but no loss of weight. Massage is apparently even more ineffective, and not the least in its alleged role of reducing local deposits of fat. In laboratory experiments it has been found that the most vigorous massage failed completely to cause any reduction in the amount of fat deposited locally in animal tissues, even though the massage was sufficiently heavy to produce multiple hæmorrhages, which could be observed in histological sections of the adipose tissue. The same applies to cosmetic preparations and to the many remarkable pieces of apparatus which are expected to reduce waistlines and hips and eliminate double chins. It is believed that massage may be of some value in restoring elasticity to the sagging skin after much fat has been removed from the entire body, including the affected region, by appropriate dieting; but for this, gentle manual massage is best. Many people will be surprised, and even a little pained, to know that exercise also is of extremely limited value in causing a general reduction of weight, because, as Krusen states, it is so much more difficult to lose weight by increasing the caloric output by exercise than it is to decrease the caloric input by reducing the intake of food. It has been estimated that the average man, if he is to lose one pound of fat, would need to climb to the top of the Washington Monument (555 feet) 48 times, or walk at least 36 miles at the rate of approximately three miles an hour. In fact, the amount of vigorous exercise required to achieve any appreciable reduction in weight is so great that such a regimen not only is very difficult, but also may be dangerous, because it throws additional strain on the already overtaxed cardio-vascular system of the obese person.

The positive alternative to these fallacies is summed up by Krusen in one sentence: "Proper reduction of the intake of food is the only logical method of reducing weight"; and the person who desires to reduce weight must be reasonably intelligent, be strongly motivated to reduce, have sufficient willpower to remain on the low calorie diet, and realize the importance of keeping his weight down. It should be realized, of course, that reduction of the intake of food is by no means as simple as it may appear. Most people who eat too much can be quite sincere when they say, "Oh doctor, I eat like a bird"; the reply of a friend of Krusen's, "yes, like a vulture", may be, in a sense, true, but it is kinder and more helpful to get these people to realize just how much they do eat. It is pointed out that such people either fool themselves or eat little compared with what they would like to eat. People who have been athletic in their youth may develop the habit of eating large quantities of food, and continue to eat over-generously during sedentary lives because they like food. Their appetite mechanism needs reeducation. For such persons, reduction of weight is difficult, but Krusen states that once they start on a weighed and carefully prescribed, well-balanced, low calorie diet, and once they are over the first ten days of adjustment to the new habit pattern, they can continue on the low calorie regimen more easily. The critical point, which is far too often overlooked, is the transition period from the reduction diet to the maintenance diet. For this a third habit pattern has to be formed and maintained with care until it is fully established. Both theory and practice combine to show that by these means worthwhile results can be obtained that are quite impossible from all the fancy methods of physical treatment, no matter how expensive they may be. As Krusen states, "the best exercise for reducing is a rapid movement of the head from right to left when the mashed potatoes and gravy are passed".

Abstracts from Medical Literature.

BACTERIOLOGY AND IMMUNOLOGY.

Adjuvants in Influenza Immunization.

J. E. SALK, MARY L. BAILEY AND ANGELA M. LAURENT (*Am. J. Hyg.*, May, 1952) have continued their work on the use of adjuvants in studies on influenza immunization by demonstrating increased antibody-formation in human subjects inoculated with influenza virus vaccine in a water-in-oil emulsion. This work developed from studies in monkeys in which the use of intramuscularly injected emulsions prepared with non-irritating agents had been free of undesirable reactions. Several strains of virus type A, type A prime and type B were prepared and concentrated and killed by formalin. They were then emulsified in a mineral oil with a special emulsifying agent; and adjusted so that the dose was contained in 0·25 millilitre amounts. Subjects were medical students and trainee nurses. Serum samples were tested before vaccination and two weeks, six weeks, three months and six months later, the inhibition of hæmagglutination technique being used. The records showed a complete absence of undesirable reactions in the subjects vaccinated, and the serological studies showed a considerable rise in antibody-formation for the six months of observation. Some tests were carried out with strains of virus not included in the vaccine, and there was some evidence of increased breadth of response. The response to A prime strains, however, was fairly low. The differences between the antigenic structure of types A and B are discussed.

Monovalent Influenza Vaccines.

G. MEIKLEJOHN, C. H. KEMPE, W. G. THALMAN AND E. H. LENNETTE (*Am. J. Hyg.*, January, 1952) attempted an evaluation of monovalent influenza vaccines with analysis of observations during an influenza A-prime epidemic. The personnel of Fort Ord had received vaccine of one of three kinds or a control solution, and the numbers concerned totalled 2151. Two months later, cases of influenza began to appear, and paired sera were obtained and attempts to isolate virus were made. Over a period of three weeks, some 164 cases of influenza were detected either by isolation of virus or from a four-fold increase in serum titres. It became apparent very soon that the group vaccinated with the A-prime type of FMI virus showed a lower case incidence than other groups—the figure being 0·9% compared with 3·8% to 5·0% in the other groups. There appeared to be good correlation between low antibody titre and the probability of clinical infection.

Bacillary Dysentery in Korea.

L. E. ZIMMERMAN, M. COOPER AND C. D. GRABER (*Am. J. Clin. Path.*, June, 1952) describe bacteriological studies in an epidemic of bacillary dysentery in Korea. They enumerate the serotypes of Shigella and Salmonella recovered, and analyse the bacteriological response to sulphadiazine, chloramphenicol, terramycin, aureomycin and streptomycin. Their patients were sick and wounded prisoners admitted to special field hospitals to which a mobile laboratory was attached. Rectal swabbings or freshly obtained specimens of fæces were cultured on Maconkey's medium and S.S. agar, and non-lactose-fermenting colonies were subcultured to Kligler's medium. Those slants demonstrating a pattern of Shigella or Salmonella were transferred to a urea medium, and those showing ammonia production were discarded as being Proteus. Tests for indol and fermentations of lactose, sucrose and salicin were used for further elimination before serological typing for final identification. Over a period of four months, *Shigella flexneri* type 4 accounted for 82% of strains recovered—a total of 734. A few type 3 were found. *Sh. sonnei* was found only twice. The bacteriological response to sulphadiazine was poor; of 17 sulphadiazine-treated patients followed three were still carrying the organism seven days later, while none of the patients treated by aureomycin, chloramphenicol or terramycin had the organism. Streptomycin occupied an intermediate position.

Vaccination and Poliomyelitis.

JOSEPH L. MELNICK AND NADA LEDINKO (*J. Infec. Dis.*, May-June, 1952) used the experimental approach to vaccination as a provoking factor in poliomyelitis. They vaccinated rhesus monkeys with pertussis or pertussis-diphtheria-tetanus combined vaccine. This was followed within twenty-four hours by intravenous inoculation of a dose of spinal cord suspension containing 100 infecting doses of poliomyelitis virus of the Lansing type. Control monkeys were injected with saline instead of vaccine. Of the vaccinated animals four out of seven developed paralysis which was not selective to the limb in which the injections had been given, while two of nine control monkeys became paralysed. In another group of animals the injecting virus was given orally, and here again there was no selection of the vaccinated limb in the paralysed animals. A group of chimpanzees also were studied, virus being fed to the animals during eighteen days in which injections of vaccine were given. None of the chimpanzees developed any clinical signs of poliomyelitis. Experiments were also carried out in mice, but no evidence could be obtained that in any animal experiments of this series vaccination procedures enhanced the occurrence of paralysis.

Differences in Tuberculin Protein Fractions.

FLORENCE R. SEIBERT, C. CRUMB AND EMMA DUFOUR (*J. . Infect. Dis.*, November-December, 1951) studied antigenic differences in two tuberculin protein fractions, *A* and *C*, in a search for a reliable substance to use as an indication of tuberculous infection. The *C* fractions were obtained from precipitates at pH 3·8 to 4·7 of an unheated, concentrated tuberculin filtrate from human strains of *Mycobacterium tuberculosis*, and in one instance from BCG. They exhibited a single electrophoretic component. The *A* fractions were separated by alcohol fractionation and were soluble at the pH of precipitation of the *C* fractions. Intradermal tests were carried out with these substances in comparison with standard "P.P.D." material, both in human subjects and in tuberculous guinea-pigs. The sensitivity of the standard test was examined in a preliminary study, and it was found that variations of as much as 10% could be obtained in parallel tests on each arm of a human subject. The tests of the two fractions showed that *C* protein gave a smaller reaction in tuberculous guinea-pigs than *A* protein, but there was little difference in BCG-vaccinated animals, and the *A* reaction was usually larger than the "P.P.D." in both humans and animals. The proteins were used to immunize rabbits, and it was found that *A* antigens produced stronger precipitins than *C*, and the serum and BCG-vaccinated rabbits gave higher titres with *A* protein than with *C*. However, complement-fixation tests with *C* protein showed higher titres than with *A* protein. The tests indicated that the two fractions differed antigenically, and that the BCG-vaccinated subjects reacted less to them than did human subjects or tuberculous animals.

Destruction of Plasmodium Gallinaceum by Reticulo-Endothelial System.

DANIEL A. ALVEREZ (*Am. J. Hyg.*, July, 1952) studied the phagocytosis and destruction of *Plasmodium gallinaceum* by cells of the reticulo-endothelial system. The phagocytes were produced by previous inoculation into the peritoneal sac of young birds of aleuronat, a vegetable albumin-starch material, in an amount of one milligramme per gramme of weight, injected in three mls of Ringer's solution. The maximum production of phagocytes occurred seventy-two hours later. Red cells infected with *P. gallinaceum* were then introduced into the peritoneal cavity; and after a further twenty-four hours the exudate was collected and supravital stain preparations were made, and subinoculations of the exudate were made into normal chickens to test the viability of the parasites. Results showed that a very large proportion of cells contained malaria parasites, and that in the subinoculated birds no parasites could be found over a period of forty days. The author used a special method of micromanipulation in order to achieve single cell inocula in their controls, and believes that the technique as well as the production of large numbers of phagocytes in the peritoneal cavity of chickens may be useful.

Therapy of Experimental Brucellosis.

E. H. KELLY AND ARTHUR N. GORELICH (*J. Infect. Dis.*, May-June, 1952) studied the therapy of experimental brucellosis in guinea-pigs. The criterion of cure used was failure to recover the infecting organism. Drugs tested included sulphadiazine given by mouth in addition to subcutaneous injection, streptomycin given subcutaneously, "Chloromycetin" given by forced feeding and subcutaneous injection, aureomycin given intraperitoneally and by forced feeding, terramycin and neomycin given subcutaneously, and immune serum given intraperitoneally. Treatment was begun within three weeks of infection and maintained for two weeks. Rapid diminution of the number of organisms obtainable from spleen and liver was obtained in animals treated with sulphadiazine and with streptomycin and with these two drugs in combination. The addition of

immune serum did not increase the curative effect. Aureomycin appeared to increase the efficiency in combination with sulphadiazine. The authors discuss the significance of their results in the guinea-pig and their possible significance in treatment of human disease. They suggest that their experiments set extremely rigorous conditions of length of time of infection before treatment and standard of cure, since sulphonamide-antibiotic combined therapy is of great use in controlling acute brucellosis in the human subject.

Observations with Electron Microscope on Chick Membranes Infected with Influenza Virus.

J. S. MURPHY AND F. B. BANG (*J. Exper. Med.*, March, 1952) have made observations with the electron microscope on cells of the chick chorio-allantoic membrane infected with influenza virus. Preparations were made from allantoic fluid, from tissue cultures prepared in the Maximow slide cell, and from cultures prepared by the roller-tube method. The concentration of virus was possible in allantoic fluid to study the length of virus filaments and diameter of spherical particles. In the Maximow preparation some cells showed no particles or filaments, and failures in technique would result in cell degeneration, swelling of mitochondria and the appearance of sac-like objects at the cell surface. The roller tube was the most successful technique to use early in the course of infection. However, this also revealed that single cells from the chorio-allantoic membrane showed normal filamentous processes which differed somewhat from virus filaments, but this made interpretation difficult. Finally, sections from the chorio-allantoic membranes were prepared in such a way as to permit electron microscopy, and here again the "normal filament" appearance was recognized. Virus particles could be recognized also, and they were always in relation to the cell surface, though not in relation to every cell. The study did not produce evidence of virus within the cell, or of cell rupture to permit of its release. The authors emphasize the fact that virus is present in increasing amount during the thirty hours' period under study, and during this time the cell manifests little change.

HYGIENE.

Epidemiological Aspects of Brucellosis.

M. FEIG (*Am. J. Pub. Health*, October, 1952) discusses the epidemiology of brucellosis in the United States of America where the incidence of reported cases reached a peak of 4·4 per 100,000 of the population in 1947. In 1951 this rate had dropped to 1·9 per 100,000. The author shows by analysis of reported cases that the distribution of the three strains (*melitensis, suis* and *abortus*) in human infections is predetermined to some extent by the nature of the predominant livestock industry in the area under observation. The numerical distribution is shown to be subject to modification by the varying infectivity of the different strains to animals and human beings, the size of the herds, the varying percentage of herd infection and the methods of transmission. The author discusses the two accepted methods of transmission —namely, from infected animals to man through ingestion of infected raw milk products and by direct contact with infected animals or their tissues. He states that additional data are necessary to determine the relative importance of these two methods of transmission and suggests that other methods, such as by respiratory and ectoparasitic channels, may exist. In the series presented there was an unexplained uneven sex distribution. The ratio of males affected to females was 4:1. Even in non-contact infections this ratio was 3:1 in favour of males. The majority of infections occurred in the age group twenty to forty-nine years. This was most apparent in the group in which transmission was assumed to be due to direct contact. An investigation of the seasonal distribution gave varying results. The author discusses brucellosis as a public health problem and concludes that the incidence, duration, disability and case fatality rate provide no indication that it is of major importance.

Occupational Skin Cancer in Tar Workers.

R. FISHER (*Arch. Indust. Hyg.*, January, 1953) has surveyed the skins of 241 men employed at a tar distillery to see if there was any relationship between type of skin and development of skin changes due to tar. The skin changes found are briefly described. There was no evidence that fair-headed men were more prone to tar warts than dark-haired men. There was significant evidence, however, to show that susceptibility to acute tar erythema was related to susceptibility to tar warts, and chronic tar skin did not necessarily precede the development of tar warts.

Study of Communities Fluoridating their Communal Water Supply.

L. MENCZER (*Am. J. Pub. Health*, November, 1952) collected information from 98 communities in the United States of America who were fluoridating their communal water supplies as a means of reducing the incidence of dental decay. The population of the communities involved varied from less than 5000 to more than 100,000. Of these communities 54% were using sodium fluoride, 43% were using sodium silicofluoride, and 3% were using hydrofluosilic acid or hydrofluoric acid. None reported difficulty in obtaining their chemicals. Fluoride dosage of water varied from 0·5 part per million for the summer months in the southern States to 1·4 parts per million for the winter months in the northern States, dependent on water consumption, which in turn is dependent upon mean minimum and mean maximum temperatures. In 90% of communities fluoridation was financed from water revenue. In the remaining 10% it was financed from general funds (6%) and health department and other funds (4%). In 98% of all reporting communities fluoridation had been brought about through action by dental, medical and public health groups as well as an informed public. In only 2% was fluoridation submitted for public referendum. With reference to complaints received concerning fluoridation, 80% of communities reported no complaints. The remaining 20% reported isolated complaints, but these were purely imaginative, since in almost every instance the complaint was registered between the date of the announcement of fluoridation and the actual date of inception of the fluoridation programme. The author states that fluoridation has tremendous public support, is inexpensive, and within optimum limits is safe and beneficial.

Tuberculosis in Viet Nam.

P. AMOUROUX (*Rev. tuberc.*, Number 9, 1952) has reported the fate of 404 patients found to be suffering from pulmonary tuberculosis in Viet Nam, 52 having known infections and 352 having a recent diagnosis. Of these 114 were regarded as beyond aid, 83 refused treatment, 24 were not treated and the remaining 183 were treated by modern methods, 138 by pneumothorax. In only 15 cases were the results of treatment promising.

Incidence of Phases I and II of Shigella Sonnei.

S. BRANHAM, S. CARLIN AND D. RIGGS (*Am. J. Pub. Health*, November, 1952) report an investigation of 100 individuals from whom *Shigella sonnei* was obtained by means of rectal swabs. They state that in cases of clinical dysentery caused by *S. sonnei*, phase I of this organism was found to be overwhelmingly predominant, primary cultures being from 90% to 100% colonies of this form. Agglutination of these was by phase I antiserum only. Primary cultures from carriers, on the other hand, contained very few phase I colonies, but a preponderance of phase II, usually 80% or more. A description is given of the techniques used and the types of cultures obtained. The authors state that during routine laboratory maintenance, phase I cultures tended to go over into phase II, and the large flat form of "R" colony often became predominant. Three "R" forms, always unstable in broth, had very low virulence for mice. Even though phase I organisms were often few in the older cultures, pure colonies of these retained specific characteristics and were as virulent for mice as those on the original plates from human patients. Evidence indicates that it is phase I of *S. sonnei* that is of clinical and immunological importance.

Athletic Injuries.

A. THORNDYKE (*New England J. Med.*, October 9, 1952) discusses the incidence and prevention of serious injuries arising out of athletic sports in college students. He states that in body-contact sports the protective strapping of every joint with a history of sprain has paid dividends in minimizing subsequent disability. Simple joint sprains, if permitted to recur, can cause serious derangements. An athlete who has had a fracture-dislocation requiring surgical intervention or an injury affecting the spinal cord, or who has lost an eye, should never be permitted to participate in body-contact sports, but may take up some other type of sport. Those who have had the spleen or a kidney removed, or who have had cerebral concussion more than three times or concussion with more than momentary loss of consciousness at any one time, should not be exposed to further body-contact trauma.

Special Articles for the Clinician.

(CONTRIBUTED BY REQUEST.)

LXIII.
MUMPS.

History and Definition.

THE history of mumps goes right back to the earliest days of recorded medicine. The florid disease with characteristic swelling of some of the salivary glands does not present any diagnostic difficulty, but many atypical forms occur which may cause trouble for the clinician. Numerous attempts have been made to improve on the old-fashioned name for the illness, but modern developments have disqualified even the most popular learned synonym—epidemic parotitis. In 1934, Johnson and Goodpasture definitely established that mumps is an acute infectious condition due to a specific virus, which has been isolated and cultured and used for experimental work on the corollary aspects dependent on the discovery of the viral origin. We are thrown back then on the old-established name as superior to all the other terms which have been proposed.

Curiosity prompts us to wonder how the queer name arose and what it signifies. In Bailey's Dictionary (1755) it is defined as "a sort of quinsey or swelling of the chaps" and is derived from a Belgian word meaning "to mumble". Samuel Johnson regarded it as "a squinancy" or suffocative condition. The Germans use precisely the same word—mumps. The French paraphrase it to "glands of the neck" or "parotitis". Scottish people call it "the branks" and apply the same term to a rough halter with blocks of wood on the sides and sometimes a large curved wooden bit in the mouth to convert it into a bridle, which must be very uncomfortable for the animal. This excursion into the etymology leaves one with the idea that mumbling, grumbling and ill-humour are connoted in the popular name for the disease. From the scientific angle we found that mumps used to be known as *"cynanche parotidœa"*. The cynanches included "sore throats" of all kinds, even measles and scarlet fever. The generic name is derived from two Greek roots signifying "dog choke". It is apparent that the term "quinsy", which is still in use, owes its origin obliquely to "cynanche" through "squinancy" and "quinsey". Under certain circumstances we still feel "sick as a dog" or have "the dog's disease" when vague febrile illness descends on us associated with headache, nausea, uncomfortable breathing and swallowing and disinclination for food or work. Even today it is quite common to find that, though the patient with mumps feels miserable and out of humour, those around him seem to think that there is something amusing about it until it comes their way.

Epidemiology.

Mumps is found almost everywhere, being endemic in large cities and epidemic in more sparsely populated areas. Epidemics are prone to arise in military camps, where adolescents from the country join those from the cities and billeting is close. From the clinician's point of view, the most important epidemics occur in the populations of schools and especially among the boarders. Mumps is rare in infancy and not common under the age of five years, but occurs predominantly in the school-going years. Race, colour and sex have no significance in this respect. It is noticeable that the school outbreaks occur towards the end of the first term, when winter comes, and are liable to extend into the second term. It is often worth while for the school doctor to insist that the first term is ended a week early or that the start of the second term is postponed for a week. The transmission of the disease occurs only by close contact, and dispersal of the children will minimize the case incidence without undue spread of the epidemic. The incubation period is from fourteen to twenty-one days, and a few days more or less should be allowed for safety. The holiday period between terms should be at least three weeks if it is to provide an efficient barrier to the perpetuation of an epidemic from one term into the next. Contagion occurs through infected saliva and probably enters through the salivary ducts. The illness itself is not dangerous, but the complications may be severe. An attack, even of a minor or subclinical nature, usually confers lifelong immunity. Most adult members of a community have already become immune. Isolation of contacts is advisable from the twelfth day for about eleven days, but it is not necessary to isolate adult contacts or those who are known to have had the complaint.

Symptomatology.

A prodromal period can be recognized, but its duration is usually less than twenty-four hours. The child often complains first of earache and headache. He is likely to be a bit miserable and feels vaguely ill. In a typical case a salivary gland swells and becomes stiff and somewhat painful. The parotid gland of one side is most commonly concerned. The area feels brawny, and the swelling interferes with smooth action of the jaws, as in speaking or eating. As the lobe of the ear is pushed upwards and forward, the ear becomes unduly prominent. The skin over the affected gland gets tense, sensitive and a bit shiny, but not red and œdematous. Suppuration does not occur except with the rare concomitance of coccal infection. Excessive salivation is not a feature. The orifice of Stenson's duct should be inspected and, at an early stage, it is usually found to be prominent in the cheek of one or both sides. Early diagnosis can be assisted on microscopic examination of a swabbing from the orifice by failure to find polymorphonuclear cells; they would be present if the abnormal appearance of gland and duct opening was due to inflammation or obstruction by calculus.

As the disease develops the affected glands become much more swollen, harder and more sensitive with some lymphadenitis and œdema of the neighbouring tissues. By the third or fourth day the maximum affection is reached, but regression is often a slow and tedious process. There is a definite tendency for salivary glands other than those first under notice to become affected progressively; but it is only occasionally that both parotid, both submaxillary and both sublingual glands are all involved clinically. The sublingual glands are seldom participants, and it is very rare for them to be affected alone. At times, and much more frequently than it used to be thought, none of the salivary glands show clinical evidence of involvement. Even then complications may be manifested and, by modern methods, the association with the virus of mumps can be demonstrated. It is not uncommon to find that the pharyngeal wall is congested, and the fauces and buccal mucosa may be redder than usual. Feverishness, headache and malaise of mild or severe degree are indicators of invasion of a general systemic nature, and there is usually some sign of meningeal irritation or of œdema of the cerebral tissues. There is an accumulating amount of evidence of cerebro-spinal pleocytosis, even without clinical meningo-encephalitis. It is also usual to find a relative increase in the number of lymphocytic blood cells with or without leucocytosis.

Complications.

It is at present impossible to determine the dividing line between meningo-encephalitis of minor degree and a similar condition which is classifiable as a complication of mumps; nor can we determine its frequency without further knowledge of the extent of the occurrence of abortive mumps. When the condition occurs as a clinical complication, a dramatic change may take place in the state of the patient. A patient with ordinary mumps who is not causing concern may suddenly have a sharp rise in temperature to an alarming height accompanied by prostration, severe headache and vomiting. He may go on to manifest delirium, coma or perhaps generalized convulsive attacks. It is imperative that lumbar puncture should be performed when the suspicion of this complication is raised, even though the patient is in his own home or in the school sick bay. The virus of poliomyelitis may be at work, or the patient may have purulent meningitis or tuberculous meningitis. The prognosis is good in the meningo-encephalitis of infectious diseases and especially in mumps. Tinnitus going on to vertigo and deafness in a few days is a rare but ominous complication of mumps. The deafness is usually total and permanent. It seems to be due to true labyrinthitis and not to basal meningitis. Transverse myelitis, peripheral neuritis and personality changes are also listed as rare sequelæ of mumps.

Orchitis and oöphoritis are the commonest clinical complications of mumps. The visible evidence of orchitis is apparent in approximately one-quarter of the boys with mumps in the pubertal period. It is more often unilateral than bilateral and is variable in severity and in the stage of the illness in which it is present. Most commonly it appears within a week or two of the onset, though it is found sometimes without overt mumps or before the salivary swelling occurs. With boys in the dangerous age grouping it is advisable to support the scrotal contents without tension on a large wad of cotton wool throughout the illness while the patient is confined to bed. It is also good policy to prolong the rest period beyond the absolute need as a prophylactic measure. The scrotal swelling reaches a peak

in three or four days and then slowly subsides to normal during the next week or two. There is a danger of sterility from interstitial changes and destruction of the lining cells of the seminiferous tubules. The danger is, however, small and seldom materializes unless the testicular damage is bilateral and very extensive, which does not often happen. Girls with oöphoritis experience an unexpected rise of temperature with abdominal pain and vomiting in the course of recovery from mumps. Involvement of the breasts occurs occasionally.

Children may get pancreatitis as a complication of mumps, but its frequency is sometimes exaggerated. The severe abdominal pain, nausea and vomiting should prompt an investigation of pancreatic functional efficiency. An increase in blood serum amylase level occurs fairly regularly during the opening week of the attack of mumps and has its use in differential diagnosis in difficult cases.

Laboratory Diagnosis.

The laboratory diagnosis is dependent on the isolation and identification of the specific virus. It is confirmed by serological methods, which require that a rise in the level of specific antibody to the agent isolated should be demonstrated.

Dr. John Perry, pathologist to the Children's Hospital, Melbourne, has been good enough to obtain the following information for me from Mr. Ian Jack, of the virus department at that hospital.

The isolation of mumps virus is now attempted from saliva, or other samples, by inoculation of embryonated eggs. Until ten years ago the standard method was to inoculate the parotid ducts of monkeys, and to observe the development of a characteristic parotitis and of a rise in the level of serum antibody in the monkey. The virus does not cause any obvious lesions in the chick embryo; but its presence in the extraembryonic fluids can be recognized by the fact that these fluids will agglutinate fowl red cells, and that this agglutination can be inhibited specifically by mumps convalescent sera.

The drawback to easy isolation is due to a time factor. The virus has a long incubation period of sixteen to twenty-one days and usually appears at maximum concentration in the saliva at or just prior to the onset of symptoms. The number of successful "isolations" would be much increased if samples were submitted at the first signs of illness in a patient known to have had contact with a patient with mumps. Thus isolation is not always a practical possibility, and we must resort to serological diagnosis alone. The conclusive test is to demonstrate a rise in specific antibody during the course of the disease, though it is possible to make a presumptive early diagnosis on a single specimen of serum from the patient.

The serological approach was made possible by demonstration of growth of the virus in chick embryos. Two complement-fixing antigens known as "V" and "S" have been found in chicken embryonic fluids and tissues. They can be prepared mutually free of each other. They give rise to two distinct antibodies; and it is because of differences in the relative rate of formation of these two antibodies in the serum of the patient that it is possible to give a presumptive diagnosis from a single sample. A further test is to determine the titre of anti-hæmagglutinin. This is the antibody which inhibits the agglutination of erythrocytes by the virus particle. It appears to be identical with the anti-"V" antibody.

On the basis of the respective titres, it is possible to classify a patient's serum into the groups shown in Table I.

The presumptive diagnosis on a single serum sample is possible because of the varying rate of formation and also of decrease of the two antibodies. Unfortunately, it does not hold for all cases, for in about 30% a reverse order may be found. It is therefore imperative that a second serum sample be submitted for examination ten days after the first one.

Skin-testing with inactivated virus is of little use in diagnosis, for dermal hypersensitivity develops only towards the seventh or eighth week after the onset; and, furthermore, the actual test tends to cause the production of antibodies which may interfere with the interpretation of subsequent serological tests.

Prophylaxis and Treatment.

A considerable amount of experimental investigation aimed at practicable prophylactic and therapeutic measures has been in progress in the past decade, but little of great clinical value has yet been reported. Those interested should study the numerous reports published in *The Journal of Experimental Medicine* since 1945 which have been contributed by J. F. Enders and his colleagues. The informative summary in the "Mitchell-Nelson Text Book of Pediatrics", Fifth Edition, 1950, is by Joseph Stokes, junior, who has been closely associated with this original research work. Professor Sabin, of Cincinnati, has carried the information a little further in his contribution to Parson's "Modern Trends in Pædiatrics", 1951, Chapter XIII, page 283.

Administration of convalescent serum or γ globulin to vulnerable contacts has been practised, but it has not met with general acceptance. Enders and other have prepared specific vaccine and have succeeded in immunizing monkeys from experimental mumps infection. Nothing of the kind has yet been confidently recommended and made available for use in medical practice. Segregation and removal from exposure are our best prophylactic measures. The testes in young males should be suspended. Highly seasoned foods are best avoided as they are reputed to increase the tension in the salivary glands and thereby make the pain worse.

TABLE I.

Classification.	Anti-hæmagglutinin and/or Anti-"V" (CF).	Anti-"S" (CF).
(a) Present infection, acute phase	Negative or low.	Moderate positive.
(b) Present infection, convalescent phase	Moderate positive.	High positive.
(c) Recent past infection (two to six months)	High positive.	High positive.
(d) Long past infection (more than six months)	High positive.	Low or negative.

There are few ailments in which rest in bed is more valuable as a therapeutic agent; the risk of complications is diminished, the patient can be made comfortable, and his schoolmates are protected while he is isolated. The sympathetic use of sedatives to reduce temperature and to relieve pain and headache also helps considerably to assuage misery and anxiety. Food that does not require full opening of the mouth or overuse of the jaws should be advised. Diagnostic lumbar puncture, examination of serum specimens and blood examinations are sometimes required. The treatment of the complications is chiefly symptomatic. The prognosis remains good even when things go wrong. Reassurance as to that ultimate outcome of the illness is often of great help to the sufferer and to his parents and friends. Atypical meningo-encephalitis occurring without diagnosable mumps remains the greatest clinical problem associated with the disease. Complement-fixation tests on two serum samples as described above may be of assistance to the clinician. Administration of γ globulin and recent convalescent serum have been used in treatment, but without sound scientific support.

H. BOYD GRAHAM,
Melbourne.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on December 11, 1952, at the Robert H. Todd Assembly Hall, British Medical Association House, 135 Macquarie Street, Sydney, DR. R. H. MACDONALD, the President, in the chair.

Anæsthetic Injuries.

DR. C. N. PATON read a paper entitled "Accidents in Anæsthesia" (see page 721).

DR. E. A. HEDBERG read a paper in which he defined the function of the anæsthetist as an effort so to modify the perception of pain and the tone of muscles that the patient suffered the least physiological disturbance before, during and after surgical procedures. He said that such a definition brought out the unity of aim of both anæsthetist and surgeon, for surgery might be regarded as an attempt, by mechanical means, to correct or to improve function. To borrow an analogy from the *Ayur Veda*, the surgeon and the anæsthetist were the two wheels of the cart, and both must fulfil their function. Both were concerned with the

occurrence of injuries under anæsthesia, and it was undoubtedly the object of the present meeting to heighten their mutual awareness of such injuries and to reflect on their nature, on the mechanism of their causation and on what steps anæsthetists and surgeons, severally or together, might take to prevent them.

Dr. Hedberg went on to say that it was of some interest to reflect on the varying degrees of responsibility for such happenings. How far did the overall responsibility of the surgeon for the case extend? Was he alone liable for any mayhem that occurred? Did the offer of a choice of anæsthetist to the patient alter the situation? If the surgeon collected a fee for the anæsthetist, was the degree of responsibility greater than if he made such arrangements directly with the patient? Again, what difference did the standing of the anæsthetist make? Dr. Hedberg said that he was more apprehensively aware of the patient's general condition and of activities in the theatre generally when, for example, a junior resident medical officer was giving the anæsthetic. One tended to be lulled by the scientific expedition and smooth professional patter of the members of the Section of Anæsthesia, but Dr. Hedberg wondered how much legal significance such an attitude had. However, there was no doubt that, whatever the legal position, the last-mentioned condition was the more desirable; for surgery demanded relaxation, not only of the patient, but also of the surgeon. Dr. Hedberg said that to facilitate discussion of the injuries occurring under anæsthesia they might be grouped under the following headings: (i) dosage, (ii) site, (iii) active trauma, (iv) passive or postural trauma, (v) regurgitation, (vi) undue disturbance of physiological mechanisms. With regard to dosage, one had to consider the nature and amount of the anæsthetic agent used and the possibility of pharmacological injuries. Under the heading of site were included the questions of intraarterial and intrathecal injections. Active trauma might occur at any of three stages: during anæsthetic procedures, in relation to injection, intubation, over-inflation and the recovery phase; during the handling of the patient, for example, by the trolly men, from the dropping of an arm or as a result of excessive struggling on the patient's part; during the period of activities of the surgeon, from the application of a tourniquet, carotid sinus pressure or excessive handling of the heart and lungs. Passive or postural trauma might affect the following parts of the body: the skin, for example, wrinkles under the buttocks and burns from an electrode; nerves, as a result of pressure, and stretching; the chest when the patient was in the prone position; the eyes; the back, as from a gall-bladder rest. The possibility of injury from regurgitation raised the question of responsibility for the patient's stomach being empty. Disturbances of physiological mechanisms to be considered included prolonged anoxia, fall of blood pressure, the effects of curare and pulmonary œdema. Dr. Hedberg said that in many of the conditions mentioned both anæsthetist and surgeon played a part. The allocation of some of the responsibility must often be difficult, and in what was essentially the operation of a team too precise a legal differentiation might not be either practicable or desirable. In some of the conditions clearly one or other member was concerned; in others there was a mutual interest. In some conditions—for example, in disturbances of the physiological mechanisms—though both surgeon and anæsthetist were concerned, one must have the decision and must be able to supervise the general well-being of the patient; Dr. Hedberg thought that the anæsthetist was that person. While his activities might often be no less exacting or occasion less concern than those of the surgeon, his attention was more widely focused. He must be the chanticleer who cried alarm, and it was he who must supervise the urgent reparative measures.

DR. C. C. MCKELLAR asked Dr. Paton about the occurrence of spasm following the intraarterial injection of "Pentothal", and wished to check that Dr. Paton had suggested the intravenous injection of 10% "Novocain" solution. Dr. McKellar said that he himself found adrenaline a great help in reducing hæmorrhage particularly in the subcutaneous tissue; but had found that with many gases anæsthetists would not agree to its use. He had been told that there was no such objection to "Neo-Synephrine", and he wondered what strength solution should be used, and how much. With regard to brachial plexus palsy, Dr. McKellar suggested that they might not theorize so much about which positions were harmful, but avoid those which constituted a strain in the conscious patient. He would himself be more worried about extension than about abduction, which would be easier to miss when the patient was on the table. He pointed to the fact that orthopædic surgeons had long ago abandoned the 90° extension on an abduction splint. Finally, Dr. McKellar said that he wished to make a plea. There were many good papers from first-class anæsthetists that did not carry as much weight as they should. He would like to see a statement in THE MEDICAL JOURNAL OF AUSTRALIA from the Australian Society of Anæsthetists about the essential precautions that should be taken, absence of which would constitute negligence.

DR. V. J. KINSELLA said that he would answer Dr. McKellar's questions. Dr. McKellar was concerned about the anæsthetists leaving out adrenaline; so was he. He had been taught for a long time that the addition of vasoconstrictors (adrenaline or "Neo-Synephrine") lessened the toxicity and prolonged local action. He himself preferred "Neo-Synephrine" to adrenaline, because it could be autoclaved with the procaine. He used one ml of 1% "Neo-Synephrine" solution in 500 mils of 0·5% procaine solution. That did not seriously affect the blood pressure. Dr. Paton had said that it added to the toxicity; Dr. Kinsella was interested to know why. Adrenaline was a normal part of the body fluids. If too much was injected, it might kill the patient. He had not seen that happen with adrenaline, but had seen it happen with water. It was not necessary to discard adrenaline or water. With regard to local anæsthesia and the occurrence of sloughing, Dr. Kinsella had never seen, heard or read of it, except when a vasoconstrictor had been injected into a digit, which was, of course, a technical error. He had been interested in Dr. Paton's observation that the best position for recovery from anæsthesia was the semi-prone position. He himself had for a long time thought that that was so; when he was in general practice, he had always put children into that position after tonsillectomy. He had even wondered why it had not been adopted in hospital practice, and had thought of introducing it into his wards. The reason why he did not do so was that he was afraid that the patient's face might more easily become buried in his pillow. Referring to the question of instilling castor oil into eyes, Dr. Kinsella said that he had often wondered what value it could have in preventing injuries, or when put in as a form of treatment, and how long it stayed in the conjunctival sac. Dr. Kinsella then spoke of the reasons why spinal anæsthesia produced nerve damage. Dr. Paton had suggested that direct injury by the needle was a factor; but his report of a case of diplopia suggested that the anæsthetist could not have got so far as that with his needle. The question had been discussed by Foster Kennedy, a New York neurologist, who described terrifying results. He suggested that some people's nervous tissue might be sensitive to the anæsthetic agent used. Dr. Kinsella thought that that might be true. It was known that one of the causes of injury might be the introduction of bacteria in the spinal anæstheic solution, or the chemicals used might be wrong. Not long before reports had appeared in the *British Medical Journal* of cases in which the bacterium introduced was *Bacillus pyocyaneus*; the results were disastrous, paraplegia resulting and lives being lost. The human element would continue to introduce mistakes into such complicated procedures. Sometimes the fluid used would be wrong. Surely it should be practicable to introduce solutions into the most innocuous spot, and surely the subarachnoid space should be the last place to choose. They should not be introduced into the theca. In anæsthesia for hernia operations, the solutions could be introduced into the site of the hernia itself, so that if germs or wrong chemicals were present, the damage done would be minimal. Dr. Kinsella said that after listening to the two speakers, he thought that some principles of practice might be drawn. If any principle had emerged from Dr. Paton's clear and interesting exposition, it was that, since every added step in anæsthesia carried with it its own particular dangers, no potentially dangerous steps should be added unless they were definitely indicated. He was sure that that principle was observed by the older and more experienced anæsthetists, but not amongst the tiros, who were inclined to introduce many steps that were not necessary. Letters had appeared in the journal about the dangers of the cuffed endotracheal tube, which should never be used unless really indicated for the protection of the patient, not just for the convenience of the anæsthetist. The tendency amongst the young anæsthetists was to use "sledge hammers", when more delicate instruments skilfully used would be safer.

DR. H. J. DALY said that he was very interested in the question of ampouled drugs. Serious dangers were being introduced into anæsthetic practice by ampoules that were so similar in appearance that they could easily be confused. Various firms made them, and each seemed unwilling to alter the shape or colour of its own particular ampoules. Dr. Paton had said that the manufacturers should be forced to make alterations in the cause of safety. Dr. Daly thought that the meeting should pass some resolution to induce the health authorities to force the manufacturers to fall into

line. Referring to the question of solutions, Dr. Daly said that at Lewisham Hospital he had introduced the practice of colouring the spirit used to clean the skin prior to injection anæsthesia. If it was coloured with a dye known as Harmless Red, there was no danger that the spirit and water would be confused. At some hospitals they still used uncoloured spirit, which was dangerous if the surgeon was using local anæsthesia. He might not know whether he was injecting local anæsthetic solution or spirit. Alcohol should be coloured at the source—at the government stores. Dr. Daly said that Dr. Hedberg's remarks had been interesting. He himself had never seen any injuries from compression of the brachial plexus during anæsthesia. Such an injury might be due to pressure from shoulder rests; but the trouble might be caused by unsuspected cervical spondylitis. The only injury of that type in his experience he had inflicted on himself, by holding his hand above his head and taking out a nail with a claw-hammer. He had not seen or heard of such an injury in young people. On the question of regurgitation, Dr. Daly said that the anæsthetist should be responsible for seeing that the patient's stomach was empty. He could wash out the stomach on the table or when the patient was brought into hospital. It was not very pleasant for the patient, but it should be done.

DR. W. F. SIMMONS said that the health departments and the National Health and Medical Research Council were alive to the problems mentioned in connexion with mistakes due to the way of labelling products packed in ampoules. The matter had been before the National Health and Medical Research Council for at least two years; but the problem would not be solved until two organizations got to work—the Standards Association of Australia (dealing with the colouring of solutions used in operating theatres and manufactured in Australia), and the World Medical Association, which could deal with the matter at the international level. Dr. Simmons suggested that the meeting might pass a resolution making a recommendation to the New South Wales Branch Council to bring the matter before the Federal Council, to be raised at a meeting of the World Medical Association. An attempt should be made to see whether some standard could be enforced so that the international standard for a certain preparation would be of a certain colour, in ampoules with labels the colour of which remained the same after they had been boiled. The bringing of the matter to an international authority would give the safety required. Dr. Simmons said that the statements made applied not only to ampoules used in anæsthesia, but to those containing any of the life-saving drugs which if used wrongly could cause serious harm.

Dr. Macdonald, from the chair, said that Dr. Simmons had made a valuable suggestion. He asked whether the meeting would like to make the recommendation suggested, or whether it would rather refer the matter to the Section of Anæsthesia to bring up to the Branch Council. He would be happy to accept a motion in either direction.

Dr. Daly thought that it would be perhaps better if the resolution went from the Section of Anæsthesia to the New South Wales Branch Council.

Dr. Macdonald thought that a resolution dealt with in that way should be more carefully prepared.

Dr. Paton said that the meeting was fairly representative. He moved that the meeting recommend that the New South Wales Branch Council be asked to recommend to the Federal Council that it should take the matter up with the World Medical Association.

The motion was seconded by Dr. Gwenifer Bernard, put to the meeting and carried.

DR. R. B. SPEIRS said that the use of the stomach tube would not ensure that the stomach was empty.

DR. L. T. SHEA said that the discussion could be summed up in the words of Norman James, of Melbourne. Every day many people flew between the capital cities and accepted the risk of flying, because they knew that the aircraft was under very strict and detailed supervision and maintenance before it left the ground. When a patient presented for anæsthesia and operation, he should feel exactly the same; he was taking a risk, but with average surgical procedures and anæsthesia he was taking it knowing that all possible precautions had been taken, and that every safety device was on hand. In every case the anæsthetist and surgeon should see to it that those precautions were taken. Dr. Shea was afraid that they were not always taken. He feared that in Australia no action had been taken to implement the international recommendations for colouring of gas cylinders. He himself kept ampoules of one type together; for example, everything used for intravenous injection was kept on one shelf, and others were kept in less accessible places. With regard to the question of responsibility raised by Dr. Hedberg, Dr. Shea said that it was interesting, but he could not reach a decision. He thought that the specialist anæsthetist was entirely responsible for what he did, both morally and legally. The anæsthetist's primary concern was with the anæsthetic and the patient. Sometimes the surgeon seemed to think that the anæsthetist should keep a kind of general watch as well; but he could not do so if he was looking after the anæsthetic. When things were settled and the patient was satisfactorily anæsthetized, the anæsthetist could have a look round to see that everything was in a proper position.

Dr. Paton, in reply, referred to the question of responsibility raised by Dr. Hedberg. He said that many years previously he himself had been sued in the Supreme Court, together with a surgeon, after an ether fire; the case had gone to the High Court. There it had been decided that there was no case against the surgeon and that the anæsthetist was solely responsible, as he was in charge of the ether which was the inflammable agent. With regard to Dr. Hedberg's demonstration with X-ray films, Dr. Paton said that the most important were those in which the shoulder rest was missing and that was the most important factor in the film. The shoulder rest added the last straw in stretching of the component parts of the plexus. Dr. Paton agreed with Dr. Daly that the emptying of the patient's stomach was the anæsthetist's responsibility. However, the important point was not only to see to it that the stomach was empty, but to be sure also that none of the stomach contents were regurgitated and then aspirated into the trachea. Referring to arterial spasm, Dr. Paton said that nothing at all could be introduced into an artery when it was in a spasm. He had no experience of the use of "Neo-Synephrine" in conjunction with local anæsthetic solutions; it was supposed to cause coronary artery constriction and therefore it was taboo. He had seen many gynæcologists use adrenaline. The solution was used to infiltrate the operation area in performing perineal repairs to facilitate dissection and reduce vascularity. He did know that the rise in the patient's blood pressure was astounding and it was sustained for about forty minutes. He himself did not know whether the use of adrenaline was an advantage from the surgical point of view; he thought that it was better left out.

In reply to Dr. McKellar, Dr. Paton said that he had seen sloughing in numerous situations, particularly in the extremities. No less an authority than McIntosh had pointed out the grave risk taken when adrenaline was used. In two cases the dispensary had made up the anæsthetic solution as "cocaine in adrenaline" instead of "cocaine with adrenaline". If a surgeon decided to use a potent drug like that for the sake of a little additional ease in operating, he had to remember the danger of error due to the human factor.

Dr. Paton thought that the members of the nursing staff in operating theatres were not eager to carry out the posturing of the patient, as they were often uncertain what the surgeon's requirements were. They therefore looked to the anæsthetist, who was much more familiar with such things, to take the leading part in posturing the patient. The only explanation for the occurrence of diplopia was the escape of cerebro-spinal fluid through the spinal puncture with prolapse of the brain stem through the *foramen magnum* and consequent stretching of the abducens nerve.

Referring to the use of castor oil, Dr. Paton said that its action was purely mechanical. It was instilled into the eye immediately after one had realized that ether had been introduced into the conjunctival sac, to prevent the burning effect of the ether. Dr. Paton said that he was not advocating spinal anæsthesia as a routine procedure, but he thought that there were occasions when it should be used. He would deplore its use when other forms of anæsthesia would serve just as well. He related one incident relative to the discussion. He was used to using large quantities of pethidine. At one large city hospital pethidine was put out in boxes. On two occasions he had gone to the boxes to get two ampoules of pethidine; something seemed different about the feel of them. They felt a trifle narrower than usual. On close inspection, both were found to be ampoules of adrenaline which had in error been included in the box of pethidine ampoules. Dr. Paton said that he had had only one case of severe brachial plexus palsy. The patient was a woman, aged about thirty years, who had undergone myomectomy. The table was fitted with an old-fashioned non-adjustable shoulder rest. One of the operating theatre staff hastily pulled out the patient's arm to make it available for blood transfusion. The patient suffered a severe palsy involving almost all components of the plexus, which,

however, completely recovered in eight weeks with rest and the administration of vitamin *B*. Dr. Paton said that the explanation in that case was that the shoulder girdle had been fixed by the faulty shoulder rest before the arm had been pulled out.

In reply to Dr. Shea's remarks, Dr. Paton said that the anæsthetist frequently found himself divided between pleasing the patient, pleasing the surgeon and doing his duty conscientiously. Patients, for instance, often objected to ether; yet it was still the sheet anchor in anæsthesia. If diathermy was used in the presence of ether, there was danger of fire and explosion.

Dr. Macdonald, from the chair, thanked the speakers and those who had taken part in the discussion. He said that he had been interested to hear Dr. Shea compare the crew of passenger aircraft with the team in the operating theatre. Dr. Macdonald said that at one stage in his career he had had to do a great deal of flying, and he had taken comfort from the fact that the team responsible for his welfare shared the risks from the take-off to the landing and everything in between. There was a fair amount of organization of ground staff and other people; that was excellent, but the people responsible for his welfare were with him to share all the risks. It was far too much to expect that any team responsible for the welfare of a patient in the operating theatre should share all the risks; but the very fact that the surgeon and the anæsthetist did not share that risk threw upon them as a team a grave responsibility, and they should perhaps be a little more aware of it than they had been. It was a question of responsibility as a team, and they should always look on it that way, as well as an individual responsibility.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

POACHERS.[1]

[*Australian Medical Journal*, September, 1866.]

IT seems to be pretty generally agreed that the medical act of this colony requires some modification, if for no other purpose than to enable the Medical Board to enforce its provisions. It contains indeed the most stringent enactments against that numerous tribe of irregular practitioners who live by exciting the fears and emptying the pockets of an ignorant public: but it leaves it an open question as to who shall put the machinery into operation necessary for arresting the scandalous extortion of these vampires. Cases are constantly occurring in which the most flagrant imposition and serious mischief are coincidently accomplished by some unblushing member of the never-to-be-extinguished family of Cagliostro, and when the question is put why does not somebody prosecute this quacksalver? the query is answered by the other of who is to do it? It is, however, quite unreasonable to expect that the action necessary to put the law into effect shall be taken by individuals. The odium that mentally attaches to a single-handed attempt to punish encroachments upon a justly privileged body invariably helps the offender into a condition of temporary martyrdom and the champion of the rights of his order becomes an object of popular hatred. For there is a singular perversity of the public mind by which the prosecuted quack is always translated into the persecuted philanthropist. We hear it said that with reference to such impostors that there should be a free trade in physic: that any man who can cure a disease or thinks he can cure—which is regarded as the same thing—ought to be allowed the free exercise of his craft and that he should be visited with no penalty if he should happen to kill the patient during the process of curation. It is but little encouraging to those who have expended much time and money in the process of becoming legal and competent members of one order, to find that the advantages presumably limited to the qualified practitioner may be secured by the much simpler process of intrepid self-assertion and a certain air of mystery. And that this is no fancied truth daily experience very abundantly testifies. For there are practising in and around this city medical men who find it next to impossible to earn a bare livelihood and there are also in close proximity to them impudent quacks who live in spacious houses, who ride in elegant carriages and who—proh pudor!—are met in consultation by some exceptional regular members of the profession. And this reminds us of another evil which prevails to a considerable extent in connection with this subject of poaching, namely, the engagement by quacks of needy qualified men as blinds. To secure the successful charlatan from the inconvenient results of some lapses which may have brought him into a too intimate relation with the officers of the law or in order to give validity to certificates which, wanting the signature of a qualified man, might suggest undesirable inquiries. A kind of reversal of this process is also found. There are medical men doing a wholesale practice, to which their individual attention cannot necessarily be given. Acting neither under them nor conjointly with them, but occupying, as it seems, a curiously anomalous position—neither partner nor assistant—are certain unqualified persons over whom the ægis of protection is thus thrown, and whose possible complications with the law are anticipated by preconcerted arrangements which experience suggests as necessary. The combined object, of course, is to benefit both parties, and no doubt this intention is accomplished, but it need hardly be observed how little sensible of the duty they owe to the profession of which they are members must such men be who countenance these inroads upon our privileges.

[1] From the original in the Mitchell Library, Sydney.

Correspondence.

THE PETER MACCALLUM MEMORIAL FUND.

SIR: At its meeting on May 4 the Melbourne University Council received from subscribers to the Peter MacCallum Memorial Fund £101 to be devoted to the purchase of texts in pathology. This is the residue of the money which was subscribed. A portrait of Sir Peter by Max Meldrum now hangs in the Pathology Department, and personal gifts were made to Sir Peter and Lady MacCallum.

Yours, etc.,
R. DOUGLAS WRIGHT,
Professor of Physiology.

Physiology Department,
University of Melbourne,
May 5, 1953.

MENTAL SYMPTOMS IN POISONING WITH ATROPINE AND ITS DERIVATIVES.

SIR: The report by Listwan and Whealy in the journal of April 25 of the case of the actress who developed restless delirium after instilling homatropine drops in the eye recalls a very similar clinical picture I saw last December. I was summoned urgently to see a schoolboy, aged eleven, who had suddenly become uncontrollable in his own home. The history of the case was very brief. The child was to see an eye specialist in his rooms later in the day, and the mother was carrying out the preparation prescribed, namely, the instillation of drops containing homatropine 2% at intervals of fifteen minutes. The first administration was uneventful, but immediately the second instillation was made the child became delirious. He was too restless for detailed examination, but obvious features were widely dilated pupils, flushed face, hot dry skin and frequent protrusion of the tongue and licking of the lips suggesting dryness of the mouth.

I telephoned the eye specialist and reported the facts I had noted, but he would not entertain the idea of poisoning from the drops being put in the eyes as the child had been under his care since infancy. I then asked the mother whether there was any chance of any of the drug being swallowed, but she denied emphatically any such possibility. I therefore had the child admitted to hospital; and as he was declared an intermediate patient he remained under my care.

When I saw him again three hours later he was in a high-walled cot, throwing himself from side to side or bounding from end to end, muttering incessantly and grab-

bing at invisible objects, both inside the cot and over its borders, as if chasing something that always eluded him. It was necessary to have a nurse at each side of the cot to prevent him climbing out. The house doctor on admission had given him phenobarbital sodium, one and a half grains, and, as he was of very small physique, weighing about 60 pounds, I thought a second dose of barbiturates might quieten him, and so ordered one capsule of "Carbrital" containing pentobarbital sodium, one and a half grains, and carbromal, four grains. Three hours later he was given a draught containing 10 grains each of potassium bromide and chloral hydrate. None of these drugs appeared to have the slightest sedative effect, and one hour after the draught he was just as restless and delirious as at the beginning of the attack. He was then given a hypodermic injection of one-eighth of a grain of morphine and soon afterwards settled down and went to sleep.

After sleeping about seven hours he woke up quite rational. Unlike the actress of Listwan and Whealy, my schoolboy remembered nothing of his hallucinations; in fact, when questioned, he replied with the frank simplicity of his years that he remembered nothing from when his mother put the second lot of drops in his eyes until he woke up in hospital. However, that some of his hallucinations were of small objectionable objects, was evidenced by the fact that he would occasionally jerk his tantrums to a sudden halt in order to flick at the nurse's apron or pick at his mother's sleeve.

Yours, etc.,

Carlton, J. B. WHITTEMORE.
New South Wales,
May 11, 1953.

Special Correspondence.

NEW ZEALAND LETTER.

BY OUR SPECIAL CORRESPONDENT.

Post-Graduate Activities.

IN August and September, 1953, no fewer than three distinguished overseas teachers will be conducting clinical sessions in New Zealand.

In Christchurch, Professor John McMichael, from Post-Graduate Hospital, Hammersmith, London, will work for three or four weeks, and visit the Medical School and Auckland for shorter periods.

In Wellington, Sir Heneage Ogilvie, of Guy's Hospital, will carry out a similar tour of surgical duty, and later participate in the annual meeting of the New Zealand Section of the Royal Australasian College of Surgeons, in Auckland.

In Auckland Hospital, Dr. Garfield Duncan, of Philadelphia, will undertake clinical teaching in medicine for a similar period, concentrating chiefly on metabolic disorders, diabetes and liver disease. He will visit other parts of New Zealand as well.

A New Department of Cardiology.

The inauguration of a department of cardiology at Green Lane Hospital, Auckland, has recently taken place. Dr. J. B. Lowe, a former New Zealander who until recently has been Assistant Director of the Institute at the National Heart Hospital, London, has arrived to take up the appointment. The department will work in close contact with the surgical service already in existence at Green Lane Hospital for dealing with congenital and acquired heart disease.

It is hoped that the research side will be developed in due course, perhaps on lines similar to that in chest disease at Green Lane Hospital, where Dr. J. D. Sinclair has been working as a full-time New Zealand Medical Research Council Fellow since January, 1953.

Professor M. F. A. Woodruff.

Professor M. F. A. Wocdruff, formerly of Melbourne, has arrived from Aberdeen and assumed charge of the teaching of surgery in the Otago Medical School in Dunedin, in a full-time appointment. He succeeds Professor Gordon Bell, who retired at the end of 1953.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Commonwealth Reconstruction Training Scheme: Post-Graduate Training in Medicine.

As a result of representations which have been made by the Post-Graduate Committee, the question of supplementary post-graduate training for students who have completed full-time medical courses under the Commonwealth Reconstruction Training Scheme has recently been reviewed.

It has now been decided that, if a medical graduate applied for supplementary training within the prescribed time limits, that is, (*a*) before June 30, 1947, or (*b*) within twelve months of discharge, or (*c*) within twelve months of enrolment in the full-time course, and if he neither failed in a complete year of his course nor transferred from or into his medical course, he will be considered eligible for part-time post-graduate training, subject to certain conditions.

The conditions governing eligibility stipulate that, where a period of up to twelve months as a resident medical officer in a general hospital is prescribed as a prerequisite to a post-graduate course, this period will be regarded as forming part of the course, and a trainee who graduates in medicine will be eligible for further training provided (*a*) that he commences the twelve months' period as a resident medical officer in an approved general hospital within three months after the completion of the primary degree course; and (*b*) that he commences the first compulsory course of lectures available after the completion of his twelve months' resident appointment.

These new provisions will apply to graduates who began their period of medical residence during 1952 or later. Applications from graduates who began residence before 1952 will be considered on their individual merits.

Graduates who are interested in further training and who consider that they may be eligible should apply to the Branch Office of the Universities Commission in the University Grounds, or to the Reestablishment Section, Repatriation Commission, 77 York Street, Sydney.

Benefits for part-time supplementary training are limited to £60.

Week-End Course at Broken Hill.

The Post-Graduate Committee in Medicine in the University of Sydney announces that, in conjunction with the Broken Hill Medical Association, a week-end course will be held at the Broken Hill and District Hospital on Saturday and Sunday, June 6 and 7, 1953. The programme is as follows:

Saturday, June 6: 10.30 a.m., "(*a*) Ante-Natal Care, (*b*) Question Time for Obstetrics and Gynæcology", Dr. R. B. C. Stevenson. 11.30 a.m., "Peripheral Vascular Degeneration", Dr. John Loewenthal. 2 p.m., "Some Pædiatric Problems", Dr. C. W. G. Lee. 3 p.m., "(*a*) Local Anæsthesia in Obstetrics, (*b*) Breech Delivery, (*c*) Question Time for Obstetrics and Gynæcology", Dr. R. B. C. Stevenson. 4.15 p.m., "Chronic Ulceration of the Legs", Dr. John Loewenthal.

Sunday, June 7: 10 a.m., "Cœliac Disease: Its Treatment and Early Diagnosis", Dr. C. W. G. Lee.

The fee for attendance will be £5 5s. Those wishing to attend are requested to communicate with Dr. F. Schlink, Honorary Secretary, Broken Hill Medical Association, 252 Mica Street, Broken Hill, as soon as possible.

Week-End Course at Katoomba.

The Post-Graduate Committee in Medicine in the University of Sydney announces that, in conjunction with the Blue Mountains Medical Association, a week-end course will be held at Katoomba on Saturday and Sunday, June 27 and 28, 1953. Meetings will be held in the ballroom of the Carrington Hotel. The programme is as follows:

Saturday, June 27: 2 p.m., registration. 2.30 p.m., "Medical Management of Renal Disease", Dr. A. W. Morrow. 4.15 p.m., "Breast Feeding and its Difficulties", Dr. Kathleen Winning.

Sunday, June 28: 10 a.m., "Backache", Dr. J. Hoets. 11.30 a.m., "Artificial Feeding", Dr. Kathleen Winning. 2.30 p.m., "Differential Diagnosis of Upper Abdominal Pain", Dr. A. W. Morrow. 4.15 p.m., "Common Disorders of the Feet", Dr. J. Hoets.

In addition to the above course, various social functions have been arranged, the inclusive fee being £8 8s. Fees for

attendance at the course only will be £3 3s. Those wishing to attend are requested to communicate as soon as possible with Dr. P. H. Macindoe, Honorary Secretary, Blue Mountains Medical Association, Great Western Highway, Wentworth Falls. Telephone: Wentworth Falls 81.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY AND THE ROYAL COLLEGE OF OBSTETRICIANS AND GYNÆCOLOGISTS.

Course in Obstetrics and Gynæcology.

A COURSE in obstetrics and gynæcology will be held at the Women's Hospital, Crown Street, Sydney, from August 31 to September 4, 1953, and will be limited to twenty post-graduate students in residence and nine attending as external students. The course will be given by the staff of the hospital. Fees for attendance are £8 18s. 6d. (including board and residence), or £6 6s. (external students).

Application should be made in writing to the Course Secretary, Post-Graduate Committee in Medicine, 131 Macquarie Street, Sydney, and the application should state whether it is for attendance as a resident or as an external student. Enrolment will be made in order of receipt of fees, and the list will be closed as soon as the required number of applications is received. Telephones: BU 5238, BW 7483. Telegraphic address: "Postgrad, Sydney."

THE MELBOURNE PERMANENT POST-GRADUATE COMMITTEE.

PROGRAMME FOR JUNE, 1953.

Courses for Higher Degrees and Diplomas et cetera.

Course in Bacteriology.

A COURSE in bacteriology, suitable for the D.O. and D.L.O., will commence at the Bacteriology Department, University of Melbourne, on Wednesday, June 10. It will consist of eight general lectures and three tutorials followed by practical demonstrations. The lectures will commence at 4.15 p.m., the tutorials at 3 or 3.30 p.m. The fee for the course is £10 10s.

Course in Psychiatry.

A course in psychiatry, suitable for candidates for the D.P.M., and also as a refresher, will be conducted by the committee, in consultation with the Australian Association of Psychiatrists. There will be 25 lecture-demonstrations, commencing on June 15, conducted in the late afternoons or evenings about three times a week, spread over two months. The fee for the course is £14 14s. Enrolments should be made by June 5. An additional opportunity for study will be provided by the Association of Psychiatrists, who, while the above-mentioned course is in progress, will conduct about six seminars on Saturday afternoons and Sunday mornings.

Courses for M.D. Part II and M.R.A.C.P.

Cardiology demonstrations, under the direction of Dr. D. E. Rothstadt, will commence at 2 p.m. on June 2, 5, 9, 12, 16 and 19. Demonstrations in gastro-intestinal disorders, under the direction of Dr. R. Andrew, will commence at 2 p.m. on June 23, 26 and 30 and July 3 and 7. The fees for these courses are £3 3s. and £2 12s. 6d. respectively, or 10s. 6d. per demonstration. Enrolments should be made at least one week before the commencement of the course.

Lecture by Visiting Orthopædist.

On Thursday, June 11, at 8.15 p.m., at the Royal Australasian College of Surgeons, Spring Street, Melbourne, Dr. Joseph Barr, Chief of the Orthopædic Staff, Massachusetts General Hospital, will lecture on "Observations on the Diagnosis and Treatment of Low Back and Sciatic Pain", with motion picture illustrations entitled "Sciatic Pain and the Invertebral Disk". The fee for this lecture is 15s., payable in advance to the Melbourne Permanent Post-Graduate Committee. Those who have paid an annual subscription to the committee are invited to attend without further charge.

Course at Flinders Naval Depot.

On Wednesday, June 10, at 2.30 p.m., Dr. A. J. M. Sinclair will lecture on "Diagnosis in Psychiatric Disorders", by arrangement with the Royal Australian Navy.

Enrolments.

Enrolments for the above-mentioned courses should be made with the Melbourne Permanent Post-Graduate Committee, 394 Albert Street, East Melbourne. Telephones: FB 2547, FB 2548.

The Royal Australasian College of Physicians.

FIFTEENTH ANNUAL MEETING.

THE fifteenth annual meeting of The Royal Australasian College of Physicians was held at Hobart, Tasmania, from March 18 to 21, 1953.

At a meeting of the general body of Fellows Sir Norman McAlister Gregg was elected to Fellowship of the College under the special provisions of article 44 which permit of the election to Fellowship of persons who have distinguished themselves in any branch of medical science or internal medicine. The following Members were elected to Fellowship: Dr. C. R. B. Blackburn, Dr. E. Beatrix Durie and Dr. F. Hales Wilson, of New South Wales; Dr. J. T. Cahill, Dr. M. V. Clarke, Dr. T. H. Steel, Dr. I. M. Wartzki and Dr. S. W. Williams, of Victoria; Dr. R. G. de Crespigny, of South Australia.

The following candidates who were successful at an examination for membership held in New Zealand in February, 1953, were admitted by Council to Membership of the College: Dr. L. G. Hannah, Dr. K. E. Eyre, Dr. G. H. Robertson, Dr. M. J. Murray, Dr. J. L. Newman.

ORDINARY MEETING, 1953.

THE ordinary meeting of the College in 1953 will take place at Sydney from Wednesday, October 14, to Saturday, October 17.

EXAMINATION FOR MEMBERSHIP.

AN examination for membership of The Royal Australasian College of Physicians will be held in September-October, 1953. The written examination will be held on Saturday, September 5, 1953, in capital cities of the Commonwealth where candidates are offering. The clinical examination will be in Sydney on approximately Monday and Tuesday, October 12 and 13. Only those candidates whose answers in the written examination have attained a satisfactory standard will be asked by the Censor-in-Chief to proceed to the clinical examination.

Applications to appear before the Board of Censors should be made in the prescribed form and must be in the hands of the Honorary Secretary of the College not later than Saturday, August 8, 1953. Application forms are obtainable from the Honorary Secretary, 145 Macquarie Street, Sydney.

Medical Prizes.

MEDICO-LEGAL SOCIETY OF VICTORIA.

Stewart Macarthur Prize.

THE committee of the Medico-Legal Society of Victoria has decided to make the Stewart Macarthur Prize available in the year 1953, for the best essay on a subject of medico-legal interest. The prize is one of £25. Relevant conditions are as follows: (*a*) The prize shall be open to undergraduates taking the legal or medical courses at the University of Melbourne and articled law clerks and to legally qualified medical or legal practitioners resident in Victoria of not more than three years' standing. (*b*) Each essay submitted shall be upon a subject of medico-legal interest which shall be selected by the candidate. (*c*) An essay in collaboration

between a medical and a legal candidate may be submitted, and in the event of such an essay being awarded the prize, the prize shall be divided between the authors. (*d*) All essays submitted shall become the property of the Medico-Legal Society of Victoria, which may, at the discretion of the committee, publish any of them in the Proceedings of the Society, or otherwise deal with them as the committee may think fit. (*e*) The prize shall not be awarded if either the examiners or the committee of the Society think that the standard of the essay or essays submitted is not sufficiently high to justify the award of the prize. The committee has fixed December 31, 1953, as the date for the closing of entries for the 1953 award. Entries should be addressed to the Secretary of the Society, Selborne Chambers, 462 Chancery Lane, Melbourne.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 18, of March 26, 1953.

NAVAL FORCES OF THE COMMONWEALTH.

Permanent Naval Forces of the Commonwealth (Sea-Going Forces).

Appointment.—John Hunter Stephenson is appointed Surgeon Lieutenant (for Short Service), dated 2nd March, 1953.

Citizen Naval Forces of the Commonwealth.

Royal Australian Naval Reserve.

Appointment.—Willoughby Sidney Sewell is appointed Surgeon Lieutenant, dated 10th February, 1953.

AUSTRALIAN MILITARY FORCES.

Australian Regular Army.

Royal Australian Army Medical Corps.

The age for retirement of 3/40000 Major-General F. K. Norris, C.B., C.B.E., D.S.O., E.D., Director-General of Medical Services, Army Headquarters, is extended until 25th June, 1955.—(Ex. Min. No. 57—Approved 21st March, 1953.)

To be Captains, 30th January, 1953, with Short Service Commissions for a Period of One Year.—2/40144 Bruce Stewart Clifton, 2/40148 Edward John Lines, and 2/40149 Donald Henry Trousdale.

Regular Army Special Reserve.

Royal Australian Army Medical Corps.

VX700294 Captain (Temporary Major) J. T. Hueston relinquishes the temporary rank of Major and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (3rd Military District), 21st January, 1953.

NX700420 Captain (provisionally) B. C. Pearson relinquishes the provisional rank of Captain and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (2nd Military District) in the honorary rank of Captain, 23rd December, 1952.

VX700258 Captain M. N. Lolagis is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (3rd Military District), 3rd February, 1953.

VX700313 Captain (provisionally) A. Goldman relinquishes the provisional rank of Captain and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (3rd Military District) in the honorary rank of Captain, 2nd December, 1952.

To be Captain (Provisionally), 8th December, 1952.—NX700420 Barry Clive Pearson.

Citizen Military Forces.

Northern Command: First Military District.

Royal Australian Army Medical Corps (Medical).—1/39022 Captain (provisionally) P. J. Landy ceases to be seconded for post-graduate studies in United Kingdom, 13th January, 1953. The following officers are appointed from the Reserve of Officers, and to be Captains (provisionally): Honorary Captains 1/62652 W. P. Bottomley and 1/39155 B. H. Gutteridge, 28th January, 1953, 1/62653 W. E. McGovern, 29th January, 1953, and 1/61800 A. L. Proctor, 30th January, 1953. 1/62653 Captain (provisionally) W. E. McGovern relinquishes the provisional rank of Captain and is transferred to the Reserve of Officers (Royal Australian Army

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED APRIL 18, 1953.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	1(1)	4(4)	..	..	2(2)	..	..	..	7
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	..	..	1	..	..	..	8	..	9
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	..	..	..	..	1	..	..	..	1
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	..	..	..	..	..	..	..
Diarrhœa (Infantile)	10(9)	4(4)	17(16)	..	..	..	2	..	33
Diphtheria	15(9)	6(5)	5(4)	..	5(1)	..	..	..	31
Dysentery (Bacillary)	..	..	..	3(3)	..	..	..	..	3
Encephalitis	..	..	..	..	2(2)	..	..	..	2
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	..	..	..	..	..	..	..	..
Infective Hepatitis	..	7(3)	..	..	8(7)	..	1	..	16
Lead Poisoning	..	..	3	..	1	..	..	..	4
Leprosy	..	..	..	..	..	..	..	..	..
Leptospirosis	..	..	1	..	..	..	..	..	1
Malaria	..	..	..	..	..	..	1	..	1
Meningococcal Infection	5(4)	..	..	..	..	..	..	..	5
Ophthalmia	..	..	..	..	7	..	..	..	7
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	14(10)	5(1)	13(2)	5(4)	..	..	..	..	37
Puerperal Fever	..	..	..	..	..	..	..	..	..
Rubella	..	9(7)	..	..	7(1)	..	..	..	16
Salmonella Infection	..	..	..	..	..	..	..	..	..
Scarlet Fever	17(5)	93(59)	5(4)	4(3)	3(1)	1	..	..	123
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	1	..	..	..	..	..	1
Trachoma	..	..	..	..	..	..	..	..	..
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	31(21)	18(8)	51(46)	6(4)	3(2)	4(1)	..	..	113
Typhoid Fever	3(3)	..	..	..	..	..	..	..	3
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	1	..	..	..	1
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

Medical Corps (Medical)) (1st Military District) in the honorary rank of Captain, 13th October, 1952. To be Captain (provisionally), 8th February, 1953: 1/61819 John Kelsham Fullagar.

Eastern Command: Second Military District.

Royal Australian Army Medical Corps (Medical).—2/56838 Captain (provisionally) B. Low relinquishes the provisional rank of Captain and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (2nd Military District) in the honorary rank of Captain, 16th December, 1952.

Southern Command: Third Military District.

Royal Australian Army Medical Corps (Medical).—The following officers are appointed from the Reserve of Officers, and to be Captains (provisionally): 3/129011 Lieutenant A. M. Marshall, 8th January, 1953, and 3/149015 Honorary Captain M. C. Piercy, 11th January, 1953. To be Captain (provisionally), 8th February, 1953: 3/157782 Fredric Nicolet Bouvier.

Central Command: Fourth Military District.

Royal Australian Army Medical Corps (Medical).—4/31956 Captain L. C. Lum ceases to be seconded for post-graduate studies in United Kingdom, and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (4th Military District), 31st December, 1952. The following officers are transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (4th Military District), 3rd February, 1953: Captains 4/32019 R. Barnes, M.B.E., and 4/32028 W. I. Seith.

Tasmania Command: Sixth Military District.

Royal Australian Army Medical Corps (Medical).—6/15256 Captain M. G. Ciezar is appointed from the Reserve of Officers, 28th January, 1953.

Reserve Citizen Military Forces.

Royal Australian Army Medical Corps.

1st Military District.—To be Honorary Captains: Jack Allison-Levick, 4th February, 1953, Geoffrey Frank Bradfield, Graham McLeod Hyslop and Desmond Anthony O'Rourke, 9th February, 1953, and Ian Ross Ferguson, 11th February, 1953.

2nd Military District.—Honorary Captain J. H. Steele-Smith is retired, 19th December, 1952.

2nd Military District.—To be Honorary Captains: Bevan Leslie Reid, 5th January, 1953, John Robert Paton, 19th January, 1953, Barrie Towers, 2nd February, 1953, John Grahame Richards, 4th February, 1953, and John Leslie Allsop, 11th February, 1953.

3rd Military District.—The resignation of Honorary Captain J. G. H. Refshauge of his commission is accepted, 31st October, 1952. To be Honorary Captain, 4th February, 1953: John Bernard O'Brien.

Deaths.

THE following deaths have been announced:

SCOTT.—Ernest Walter Kerr Scott, on April 30, 1953, at Brisbane, Queensland.

CUNNINGHAM.—Charles Cunningham, on May 6, 1953, at Malvern, Victoria.

Medical Appointments.

Dr. S. Gershon has been appointed medical officer in the Mental Hygiene Branch, Department of Health, Victoria.

Dr. W. J. Saxton has been appointed a member of the Queensland Health Education Council.

Dr. A. J. Metcalfe, Dr. H. E. Downes, Dr. G. M. Redshaw, Dr. J. A. James, Dr. J. A. Holt and Dr. A. S. Lane have been appointed members of the Medical Board of the Australian Capital Territory under the *Medical Practitioners Registration Ordinance*, 1931-1939.

Dr. John Rambaut Healy has been appointed a Quarantine Officer at Broome, Western Australia, under provisions of the *Quarantine Act*, 1908-1950.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Northcott, Geoffrey Charles, M.B., B.S., 1951 (Univ. Sydney), c.o. Commonwealth Bank, Chatswood, New South Wales.

Paver, William Kenneth Amedee, M.B., B.S., 1952 (Univ. Sydney), 9 Price Street, Merrylands, New South Wales.

Diary for the Month.

MAY 26.—New South Wales Branch, B.M.A.: Ethics Committee.
MAY 27.—Victorian Branch, B.M.A.: Branch Council.
MAY 28.—South Australian Branch, B.M.A.: Scientific Meeting.
MAY 28.—New South Wales Branch, B.M.A.: Branch Meeting.
MAY 29.—Queensland Branch, B.M.A.: Council Meeting.
JUNE 3.—Victorian Branch, B.M.A.: Branch Meeting.
JUNE 3.—Western Australian Branch, B.M.A.: Council Meeting.
JUNE 4.—South Australian Branch, B.M.A.: Council Meeting.
JUNE 5.—Queensland Branch, B.M.A.: General Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federal Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178 North Terrace, Adelaide): All Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all Contract Practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

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